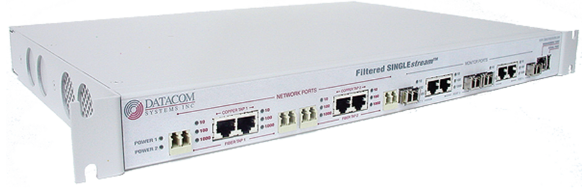
DATACOM
SYSTEMS INC.™

Filtered SINGLE*stream*™ Link Aggregation Tap



User's Guide

FSS-1000 Series (BT, SX, LX)
FSS-2000 Series (BT, SX, LX, BT/SX, BT/LX)

July 2006 541-0105-U-A.00

License Agreement

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1 Introduction

Congratulations on the purchase of your new Filtered SINGLE*stream*™. The Filtered SINGLE*stream*™ from Datacom Systems, the premiere provider of network access solutions, provides you with unprecedented flexibility for your network monitoring needs. The Filtered SINGLE*stream*™ adds powerful filtering capabilities to the link aggregation, port regeneration, and port assignment capabilities of other products from Datacom Systems. This User's Guide will help you install, configure, and use your Filtered SINGLE*stream*™ effectively and efficiently. For information regarding the initial installation of your Filtered SINGLE*stream*™, please refer to the included Quick-Connect Guide.

1.1 What is included

Filtered SINGLE*stream*™

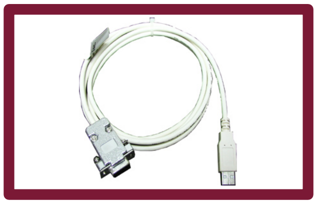
- FSS-1000 Series (BT, SX, LX)
- FSS-2000 Series (BT, SX, LX)
- Optional Small Form-Factor Pluggable Fiber Transceivers

FLOW*control*™ software CD-ROM

- Allows for configuration of Filtered SINGLE*stream*™

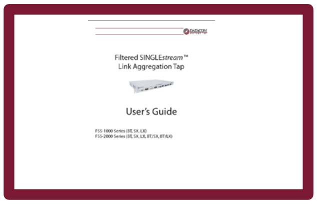
Two AC Power Cords

- Standard country-style wall outlet
- 100VAC - 240VAC power source



Configuration Cables

- Serial to USB configuration cable (Cable #DRL434-6)
- Standard 3 ft. Ethernet cable
- Standard 3 ft. crossover Ethernet cable



Filtered SINGLE*stream*™
Link Aggregation Tap

User's Guide

FSS-1000 Series (BT, SX, LX)
FSS-2000 Series (BT, SX, LX, BT/SX, BT/LX)

Filtered SINGLE*stream*™ Product Documentation

- Quick Connect Guide
- User's Guide

1.2 Descriptions of the Filtered SINGLE*stream*™ Models

The Filtered SINGLE*stream*™ is available in eight different models. This section provides details about the various models of the Filtered SINGLE*stream*™.

All Filtered SINGLE*stream*™ models come standard with four 10/100/1000BaseT Monitoring Ports. Small Form-Factor Pluggable fiber inserts are available separately to activate up to four Fiber Monitoring Ports. Each Small Form-Factor Pluggable may be Single or Multimode fiber.

! Small Form-Factor Pluggable fiber inserts are an available option to activate up to four Single or Multimode Fiber Monitoring Ports

The FSS-1000 series Filtered SINGLE*stream*™ models provide a single Network Tap and four Monitoring Ports. The models differ from each other based on the network media required to create the Network Tap.

TIP Multimode fiber is commonly referred to as short haul or SX fiber. Single-mode fiber is commonly referred to long haul or LX fiber.

Table 1.1 FSS-1000 Model Configurations

FSS-1000 Model	Network Taps	Type of Tap	Monitor Ports	Type of Monitor Ports
FSS-1000BT	1	10/100/1000BaseT	4	10/100/1000BaseT Or Optional Single- / Multimode Fiber
FSS-1000SX	1	Multimode Fiber	4	10/100/1000BaseT Or Optional Single- / Multimode Fiber
FSS-1000LX	1	Single-mode Fiber	4	10/100/1000BaseT Or Optional Single- / Multimode Fiber

The FSS-2000 series Filtered SINGLE*stream*™ models provide two Network Taps and four Monitoring Ports. The models differ from each other based on the network media required to create each Network Tap. BT/SX and BT/LX models allow for up to four sets of Network Tap connections to be made, but only two Network Taps are operational at one time.

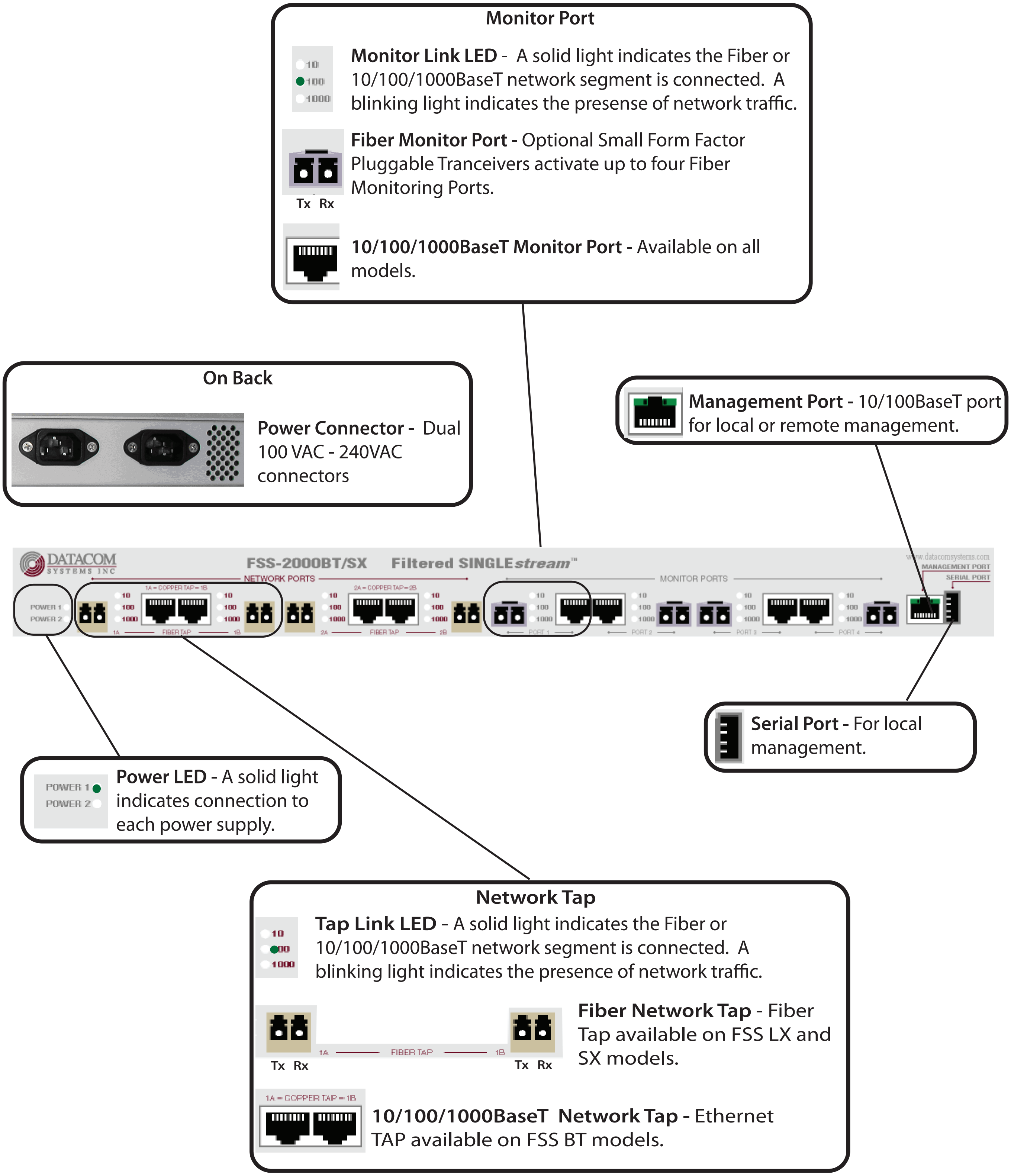
All Filtered SINGLE*stream*™ models come standard with four 10/100/1000BaseT Monitoring Ports. Small Form-Factor Pluggable fiber inserts are available separately to activate up to four Fiber Monitoring Ports. Each Small Form-Factor Pluggable may be Single or Multimode fiber.

⚠ Small Form-Factor Pluggable fiber inserts are an available option to activate up to four Single or Multimode Fiber Monitoring Ports

Table 1.2 FSS-2000 Model Configurations

FSS-2000 Model	Network Taps	Type of Tap	Monitor Ports	Type of Monitor Ports
FSS-2000BT	2	(2) 10/100/1000BaseT	4	10/100/1000BaseT Or Optional Single- / Multimode Fiber
FSS-2000SX	2	(2) Multimode Fiber	4	10/100/1000BaseT Or Optional Single- / Multimode Fiber
FSS-2000LX	2	(2) Single-mode Fiber	4	10/100/1000BaseT Or Optional Single- / Multimode Fiber
FSS-2000BT/SX	2	(2) 10/100/1000BaseT (2) Multimode Fiber	4	10/100/1000BaseT Or Optional Single- / Multimode Fiber
FSS-2000BT/LX	2	(2) 10/100/1000BaseT (2) Single-mode Fiber	4	10/100/1000BaseT Or Optional Single- / Multimode Fiber

The figure below shows the front of an FSS-2000BT/SX model. Some models do not have all of the ports that are shown below. Each Filtered SINGLE*stream*™ model is physically similar, however. All models have similar power connections on the back panel, Power LEDs, Network Tap connections, Monitor Port connections, and management connections.



Monitor Port

Monitor Link LED - A solid light indicates the Fiber or 10/100/1000BaseT network segment is connected. A blinking light indicates the presense of network traffic.

Fiber Monitor Port - Optional Small Form Factor Pluggable Tranceivers activate up to four Fiber Monitoring Ports.

10/100/1000BaseT Monitor Port - Available on all models.

On Back

Power Connector - Dual 100 VAC - 240VAC connectors

Management Port - 10/100BaseT port for local or remote management.

Serial Port - For local management.

Power LED - A solid light indicates connection to each power supply.

Network Tap

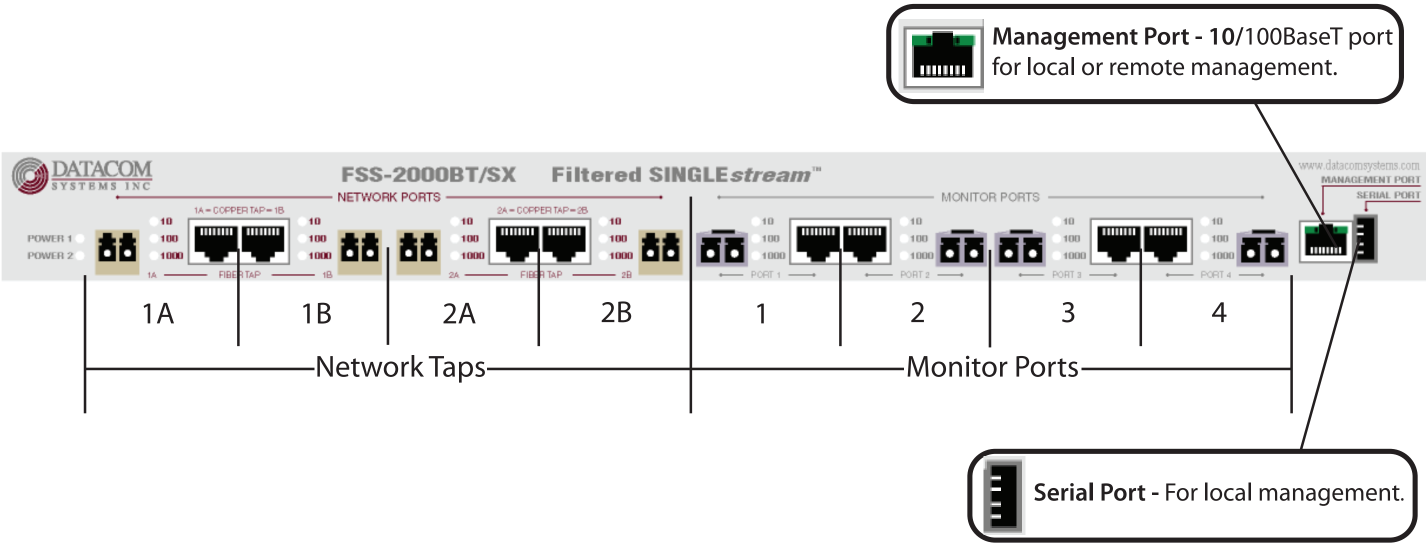
Tap Link LED - A solid light indicates the Fiber or 10/100/1000BaseT network segment is connected. A blinking light indicates the presence of network traffic.

Fiber Network Tap - Fiber Tap available on FSS LX and SX models.

10/100/1000BaseT Network Tap - Ethernet TAP available on FSS BT models.

Figure 1.1 Front Panel of the FSS-2000BT/SX

The figure below indicates how the various ports are numbered. Network Tap ports are on the left, Monitor ports are on the right. Network Taps always consist of ports A and B – regardless if the connection is fiber or 10/100/1000BaseT. Network Tap connections are dependent upon the Filtered SINGLE*stream*™ model. All Filtered SINGLE*stream*™ models have four Monitor Ports. Monitor Ports always have 10/100/1000BaseT connections. Small Form Factor Pluggable fiber inserts are an available option to activate up to four Single or Multimode Fiber Monitoring Ports. Only one type of port can be used at a time when both are available.



Management Port - 10/100BaseT port for local or remote management.

Serial Port - For local management.

Figure 1.2 FSS Network Tap and Monitor Port Numbering

The figure below shows the back of the Filtered SINGLE*stream*™. The connections for the power cables are on the back. Only one power source is required, but the Filtered SINGLE*stream*™ provides for two power connections. To create true redundancy, the power cords should be connected to separate power circuits. In the event that power is lost, the Filtered SINGLE*stream*™ passively allows network traffic to flow across the tapped network (assuming that the external network equipment is still powered).

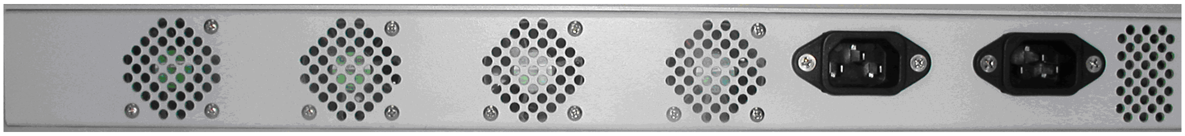


Figure 1.3 Back View of the FSS

1.3 Typical Application Diagram

The figure below shows an FSS-2000BT Filtered SINGLE*stream*™ in a network. In this example, two 10/100/1000BaseT Network Taps are created. Network Tap 1 is created between the Router and the Firewall. Network Tap 2 is created between the Firewall and the Internal Network Switch. Four monitoring devices are also connected, three via 10/100/1000BaseT connections and one via a Fiber connection.

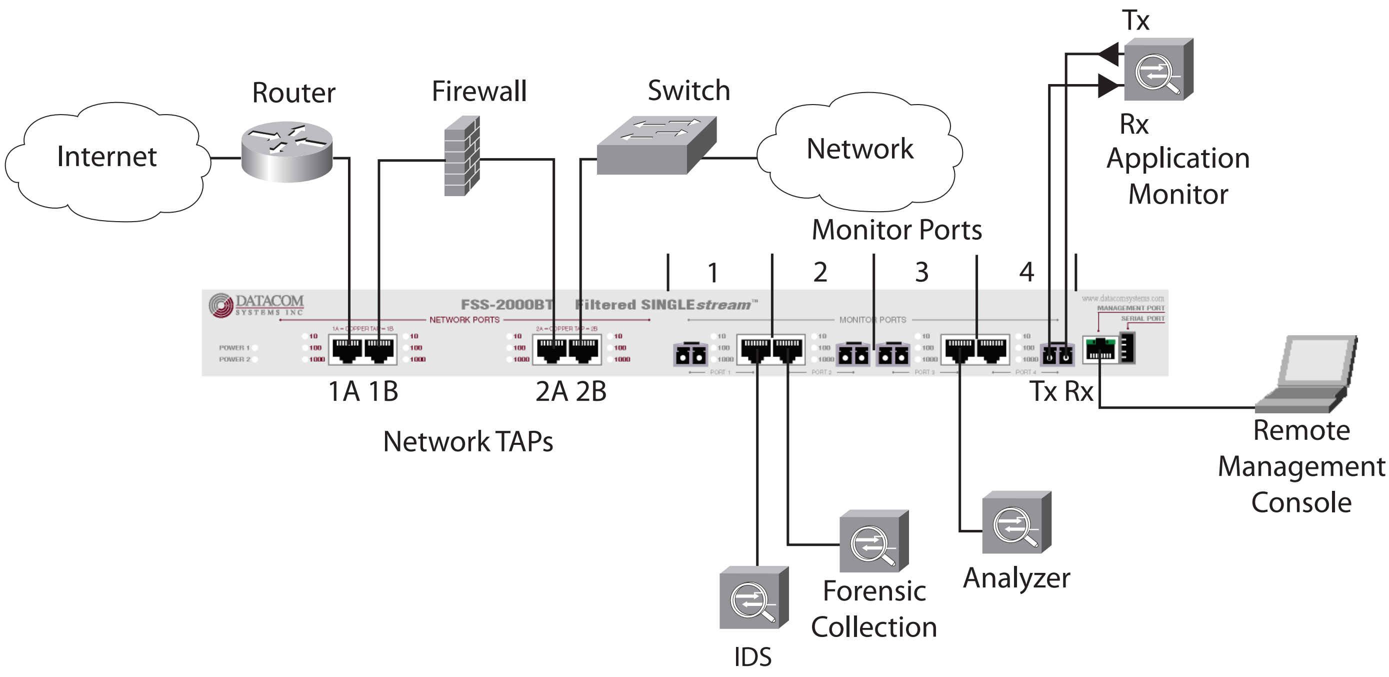


Figure 1.4 FSS-2000BT Application

All the network traffic that would normally pass between the Router and the Firewall is still passed as normal. Both Network Taps on the Filtered SINGLE*stream*™ act as passive network taps. Any information that passes through the tap is duplicated, buffered, and then available to be filtered and routed to any of the connected monitoring devices. The powerful flexibility of Filtered SINGLE*stream*™ allows the user to quickly monitor very specific network traffic from remote locations without ever having to disconnect and reconnect the cables leading to various monitoring devices.

The following sections of this User's Guide provide details about how to create a Network Tap, install the FLOW*control*™ software, and use the FLOW*control*™ software to tailor your Filtered SINGLE*stream*™ configuration to meet your network monitoring needs. Each of the following sections of the User's Guide has its own list of Quick Tips – putting the information you need right where you need it.

1.4 Conventions used in the User’s Guide

To avoid confusion, the following conventions are used throughout this User’s Guide:

- When characters are to be typed on a PC, they are written in `Courier New Font`
  - On the command line, type `SET IP ADDRESS 192.168.1.1`

- When a specific keyboard key is to be pressed, it will be enclosed in < > and written in *italics*
  - Then press <*Enter*> , or
  - Then press <*Ctrl + Shift*> (press both keys together)

- Buttons and tabs are indicated in **Bold Text**
  - Select the **Filter Configuration** tab, and then click **OK**.

- Selections on pull-down menus will be indicated by the use of arrows (→)
  - Select **Main** → **Lower Level Selection** → **Lowest Level Selection**

- TIP is used to indicate a related feature, a quick method, or another approach to accomplish the current activity
  - TIP instead of clicking **OK**, you may also press <*Enter*>.

- ⚠ is used to indicate a special notice

  - ⚠ Ensure that the Tx and Rx connections are made properly.

1.5 Installation

1.5.1 Fiber Monitor Ports

All Filtered SINGLE*stream*™ models come standard with four 10/100/1000BaseT Monitoring Ports. Small Form-Factor Pluggable fiber inserts are available separately to activate up to four Fiber Monitoring Ports. Each Small Form-Factor Pluggable may be Single or Multimode fiber.   Simply insert each Small Form-Factor Pluggable Transceiver into the appropriate Fiber Monitor Port.

1.5.2 Rack Mounting the Filtered SINGLE*stream*™

Each Filtered SINGLE*stream*™ is equipped with brackets that allow it to be mounted in a standard 19-inch rack. To secure your Filtered SINGLE*stream*™ in a standard rack, simply secure four screws that fit your rack through the gaps in the Filtered SINGLE*stream*'s ™ mounting brackets. One of the mounting brackets is shown in the figure below.

TIP To assist mounting the Filtered SINGLE*stream*™, start the lower screws first.

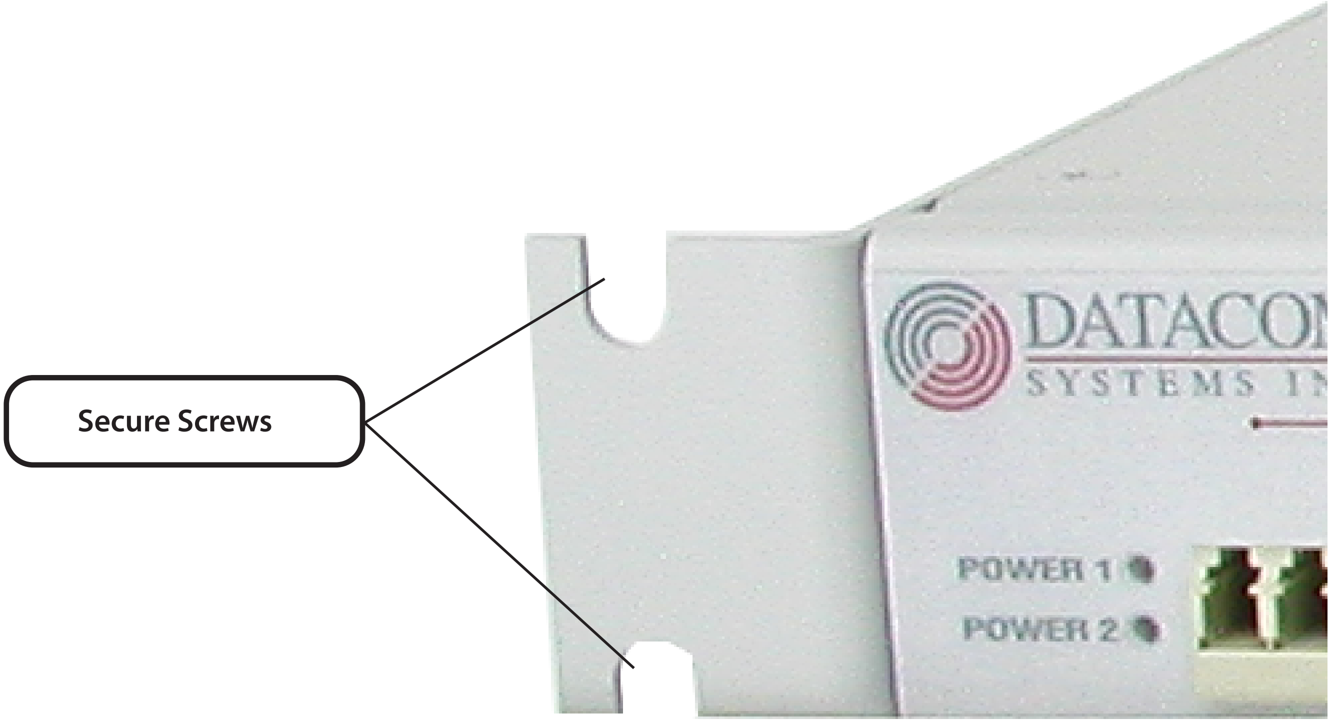


Figure 1.5 FSS Mounting Hardware

The dimensions and weight for all FSS models are given below

- Sizes: 3" (7cm) H   *x*   18" (40cm) W   *x*   9" (20cm) D
- Unit Weight: 7 lbs (3.2 kg)

⚠ Be sure to leave enough room for all the cable connections (front and back). Also, be sure to leave enough space between rack-mounted equipment to allow for proper airflow and ventilation

Quick Tips: Creating a Network Tap

- FSS-1000 series models allow for a single Network Tap to be connected

- FSS-2000 series models allow for two Network Taps to be connected

- Multimode fiber is commonly referred to as short haul or SX fiber.

- Single-mode is fiber is commonly referred to long haul or LX fiber.

- LX models allow for Single-mode Fiber connections

- SX models allow for Multimode Fiber connections

- By default, the Filtered SINGLE*stream*™ connection speed is set to 1 Mbps, full duplex. It is highly recommended you configure the Filtered SINGLE*stream*™ to use a specific speed if desired.

- You may connect four different Network Taps, however, only 2 can be active at any one time. If both 10/100/1000BaseT and Fiber connections are made for a single Network Tap, the user can dictate which tap is used by default via the FLOW*control*™ software.

2 Connecting Network Taps

To monitor traffic on your network, you must first connect a Network Tap at the desired monitoring point.

2.1 Connecting a 10/100/1000BaseT Network Tap

If you have a Filtered SINGLE*stream*™ model FSS-1000BT, FSS-2000BT, FSS-2000BT/SX, or FSS-2000BT/LX, use the following procedure to connect a 10/100/1000BaseT Network Tap.

The Filtered SINGLE*stream*™ is configured by default with a connection speed is set to 10000 megabits per second, full duplex. Once you have connected a Network Tap, you must use the FLOW*control*™ software to specifically set the connection speed of the Filtered SINGLE*stream*™. All 10/100/1000BaseT Network Taps will be physically similar, regardless of speed.

1. Identify the point within the network where you would like to connect a Network Tap.

TIP The monitored point can be any point that is of particular interest to you. For example, you may wish to monitor the data exchanged between the public Internet and your local intranet. You will be able to connect an appropriate Network Tap to monitor any network traffic of interest.

2. Verify that the Filtered SINGLE*stream*™ is powered on by checking the Power LEDs on the front of the Filtered SINGLE*stream*™.
3. Disconnect the network cable that connects the two external networking devices between which you would like to connect the Network Tap. For example, to connect a Network Tap between the Internet Router and the Firewall remove the cable between the Firewall and the Router.

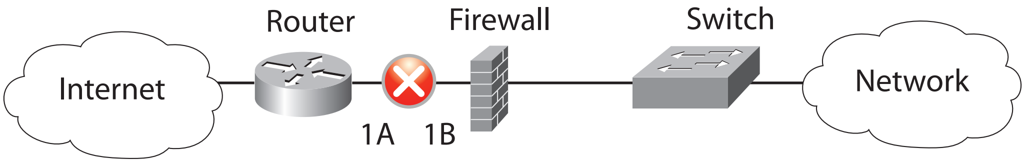


Figure 2.1 10/100/1000BaseT Network

4. Next, you must connect both the Router and the Firewall to the Filtered SINGLE*stream*™. To do this, you will need two LAN cables. First, connect one end of the first cable to the Router, and the other end to the Filtered SINGLE*stream*™ Network Tap 1 Port A as shown in the figure below.

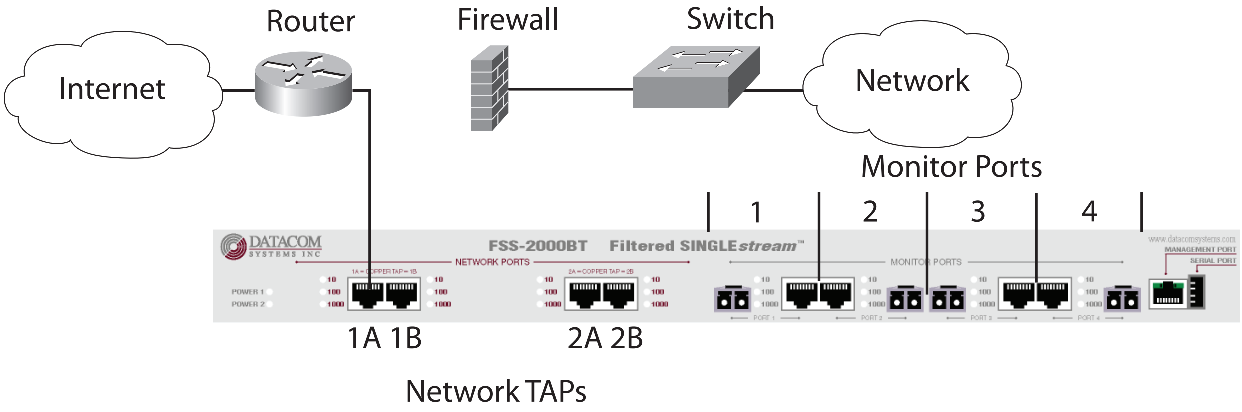


Figure 2.2 FSS-2000BT with 10/100/1000BT Network Tap 1A

5. Then connect one end of the second LAN cable to the Firewall and the other end to the Filtered SINGLE*stream*™ Network Tap 1 Port B as shown in the figure below.

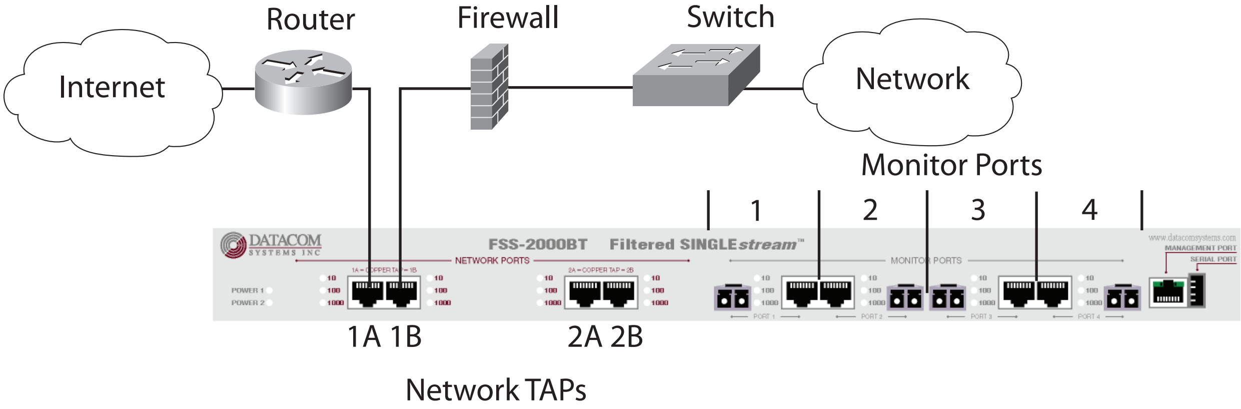
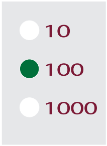


Figure 2.3 FSS-2000BT with 10/100/1000BT Network Tap 1A and 1B

6. Verify that the LEDs indicate that a network connection has been established. On the Filtered SINGLE*stream*™, the Link LEDs are located on the front panel, immediately next to the Network Tap port connections. A solid light indicates that a connection has been established at the stated speed. A blinking light indicates that network traffic is detected on the link.



Tap Link LED - A solid light indicates the Fiber or 10/100/1000BaseT network segment is connected. A blinking light indicates the presence of network traffic.

Figure 2.4 10/100/1000BaseT Network Tap Link LED

You have now successfully connected a 10/100/1000BaseT Network Tap

Owners of Filtered SINGLE*stream*™ models FSS-2000BT, FSS-2000BT/SX, or FSS-2000BT/LX can connect a second Network Tap at another desired monitoring point. An example of a network with two Network Taps is shown in the figure below (model FSS-2000BT shown).

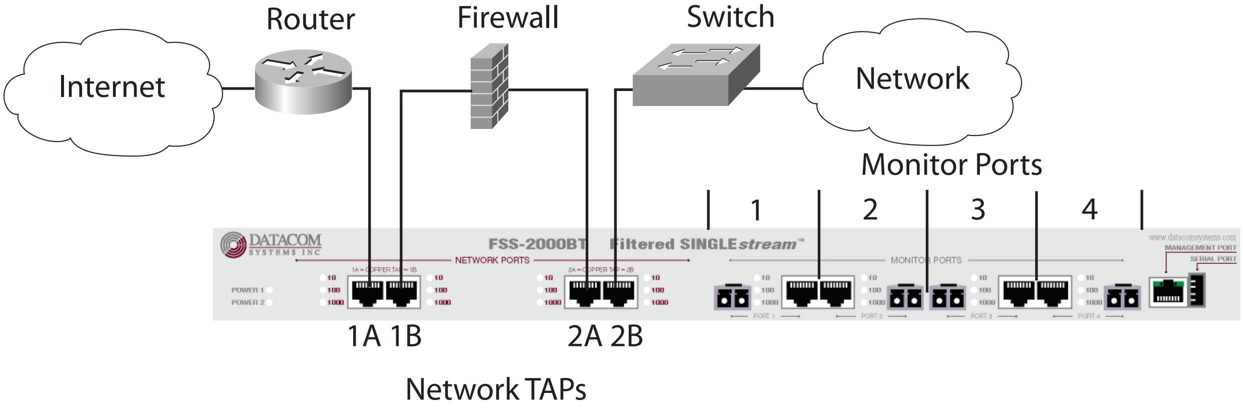


Figure 2.5 FSS-2000BT with Two 10/100/1000BT Network Taps

7. Connect a monitoring device to one of the Monitoring Ports, Monitor 1, 2, 3 or 4. Up to four monitoring devices can be connected to a Filtered SINGLE*stream*™ at one time. The Link LEDs indicate the monitoring device is connected properly and the speed of the link. **When using a Fiber Monitoring device make sure the Monitor Tx port is connected to the Rx port of the external network device; and ensure that the Monitor Rx port is connected to the Tx port of the external network device.**
8. Connect the Remote Management Console to the Management Port. The Link LEDs indicate the Remote Management Console is connected properly and the speed of the link.

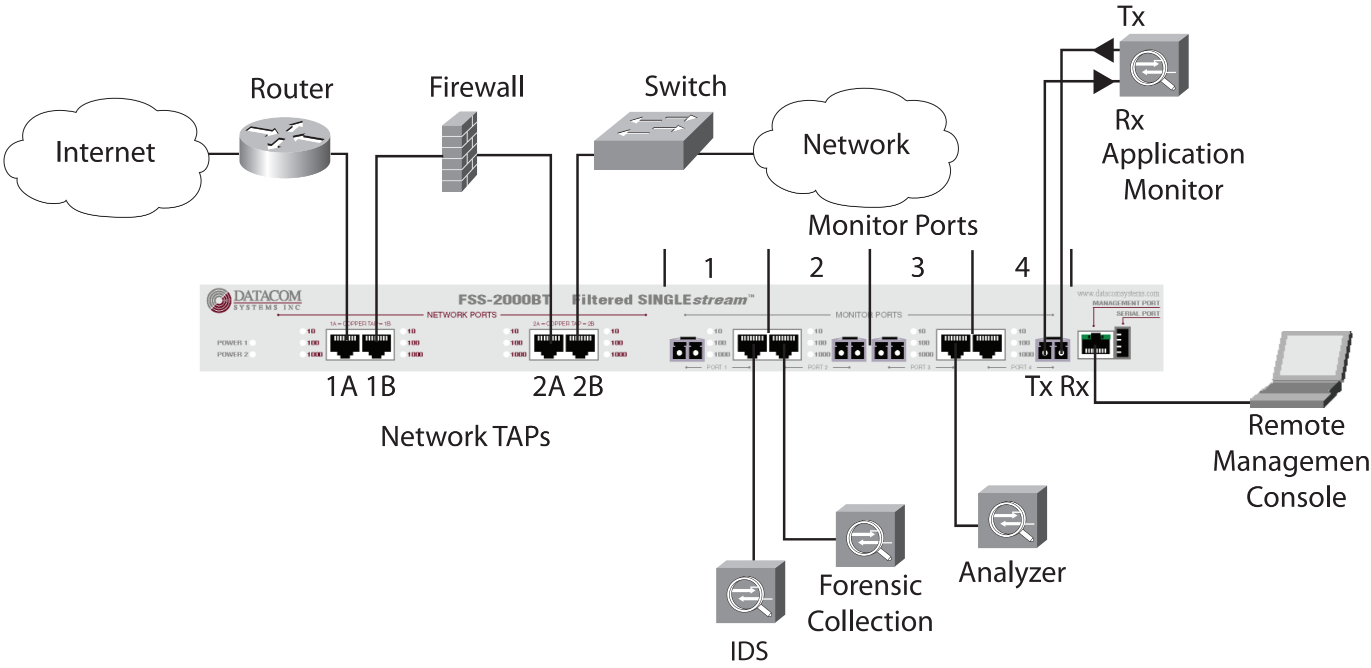


Figure 2.6 10/100/1000BaseT Network Tap using FSS-2000BT

2.2 Connecting a Fiber Network Tap

If you have a Filtered SINGLE*stream*™ model FSS-1000SX, FSS-1000LX, FSS-2000SX, FSS-2000LX, FSS-2000BT/SX, or FSS-2000BT/LX, use the following procedure to connect a Fiber Network Tap.

Both Single mode (LX) and Multi-mode (SX) fiber Network Taps are connected the same way. In each case, be sure to correctly cross-connect the Rx and Tx links between each pair of networked devices.

1. Identify the point within the network where you would like to connect a Network Tap.

TIP The monitored point can be any point that is of particular interest to you. For example, you may wish to monitor the data exchanged between the public Internet and your local intranet. You will be able to connect an appropriate Network Tap to monitor any network traffic of interest.

2. Verify that the Filtered SINGLE*stream*™ is powered on by checking the Power LEDs on the front of the Filtered SINGLE*stream*™.

3. Disconnect the fiber pair that connects the two external networking devices between which you would like to connect the Network Tap. For example, to connect a Network Tap between the Internet Router and the Firewall in the example network shown below, remove the fiber connection between the Firewall and the Router.

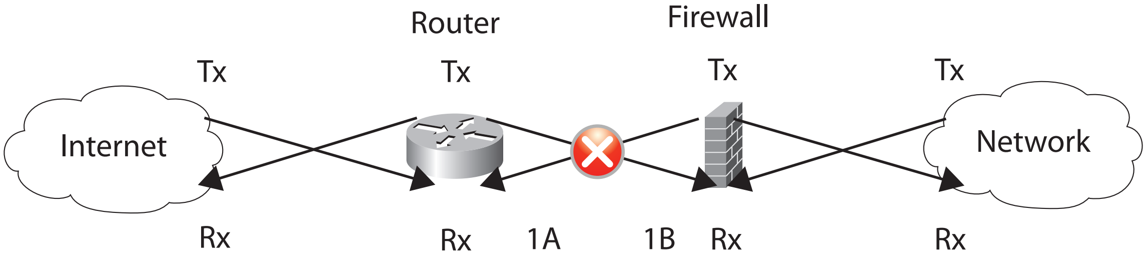


Figure 2.7 Fiber Network

4. Next, you must connect both the Router and the Firewall to the Filtered SINGLE*stream*™. To do this, you will need two pairs of fibers.

5. First using pair of fiber cables, connect the Rx of the Router to the Tx of the Filtered SINGLE*stream*™ Network Tap 1 Port A. Then, use the other fiber in the pair to connect the Tx of the Router to the Rx of the Filtered SINGLE*stream*™ Network Tap 1 Port A.

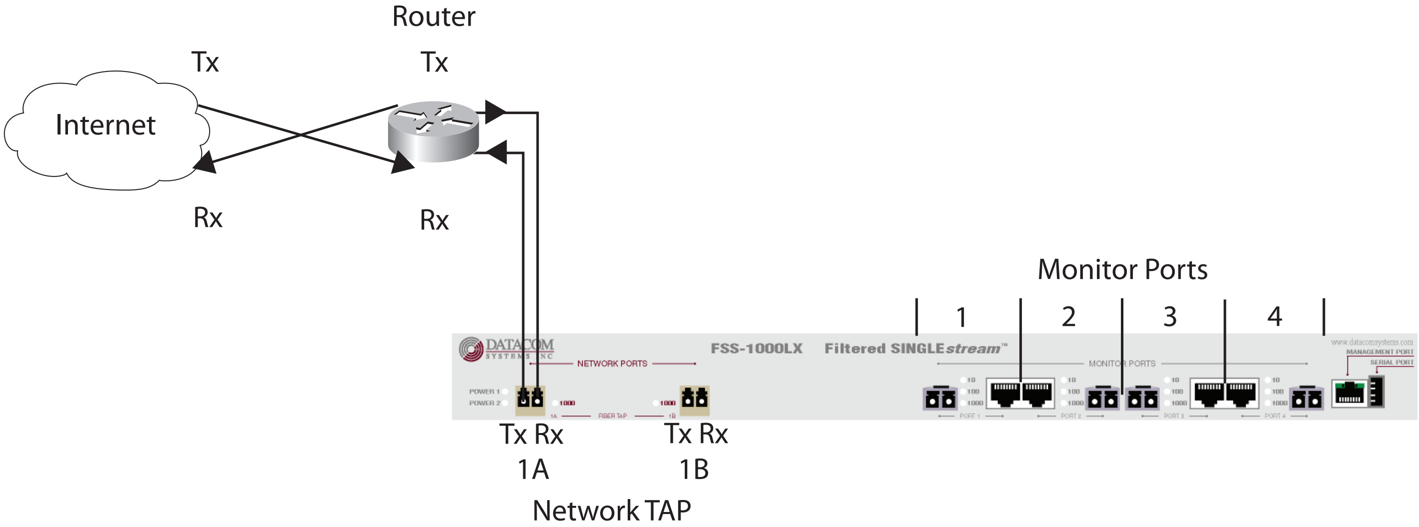


Figure 2.8 FSS-1000LX with Network Tap 1A

6. Now make a similar connection between the Firewall and the Filtered SINGLE*stream*™ Network Tap 1 Port B as shown in the figure below. Again, be sure to connect the Tx of the Firewall to the Rx of the Filtered SINGLE*stream*™, and the Rx of the Firewall to the Tx of the Filtered SINGLE*stream*™.

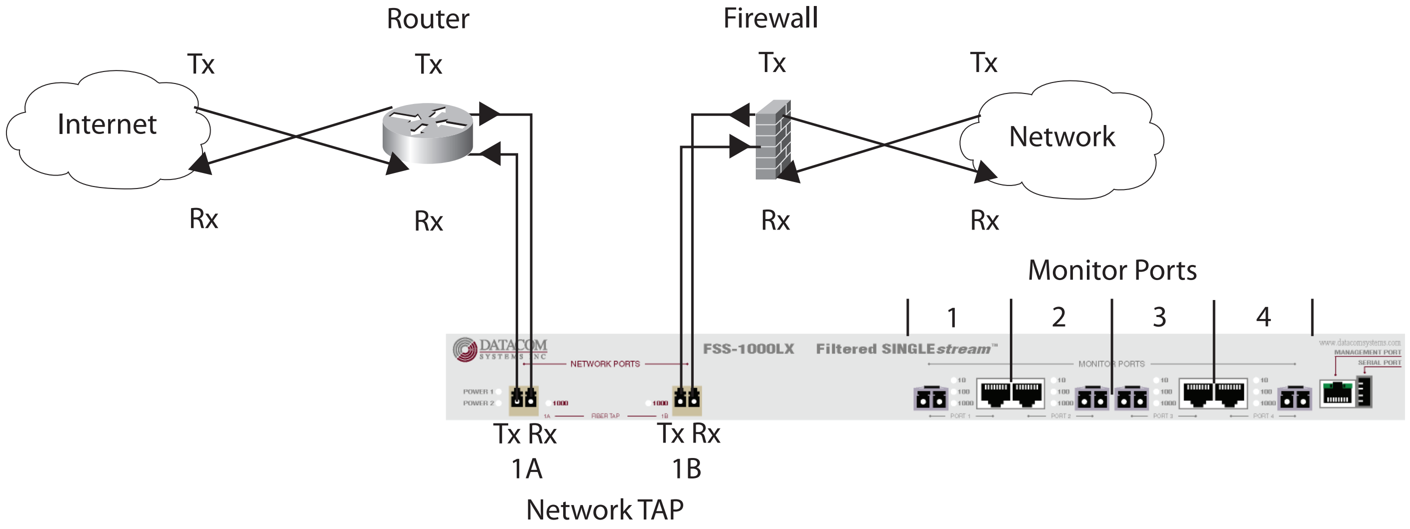


Figure 2.9 FSS-1000LX with Network Tap 1A and 1B

7. Verify the LEDs are lit indicating that a network connection has been established. On the Filtered SINGLE*stream*™, the Link LEDs are located on the front panel, immediately next to the Network Tap port connections. A solid light indicates that a connection has been established at the stated speed. A blinking light indicates that network traffic is detected on the link.

Fiber network taps can only be connected with SX and LX models. Fiber network taps only operate at 1000 megabits per second. The BT/SX and BT/LX models have LEDs for slower port speeds which only apply when 10/100/1000BaseT network taps.

Tap Link LED - A solid light indicates the Fiber or 1000BaseT network segment is connected. A blinking light indicates the presence of network traffic.

Figure 2.10 Fiber Network Tap Link LED

You have now successfully connected a Fiber Network Tap. Owners of Filtered SINGLE*stream*™ models FSS-2000SX, FSS-2000LX, FSS-2000BT/SX, or FSS-2000BT/LX can connect a second Network Tap at another desired monitoring point using the appropriate network media. An example of a network with two Network Taps is shown in the figure below (model FSS-2000LX shown).

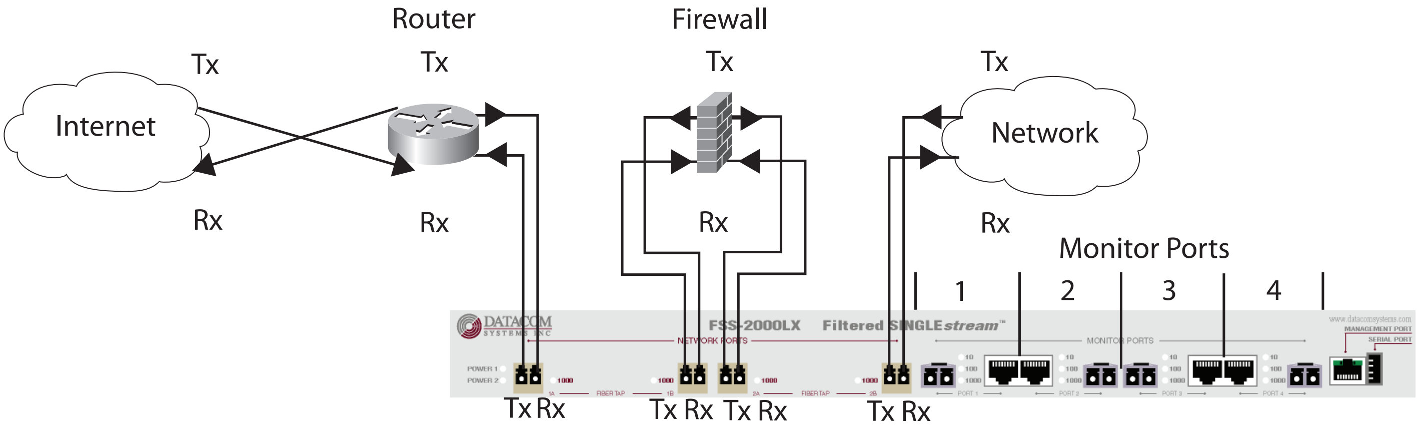
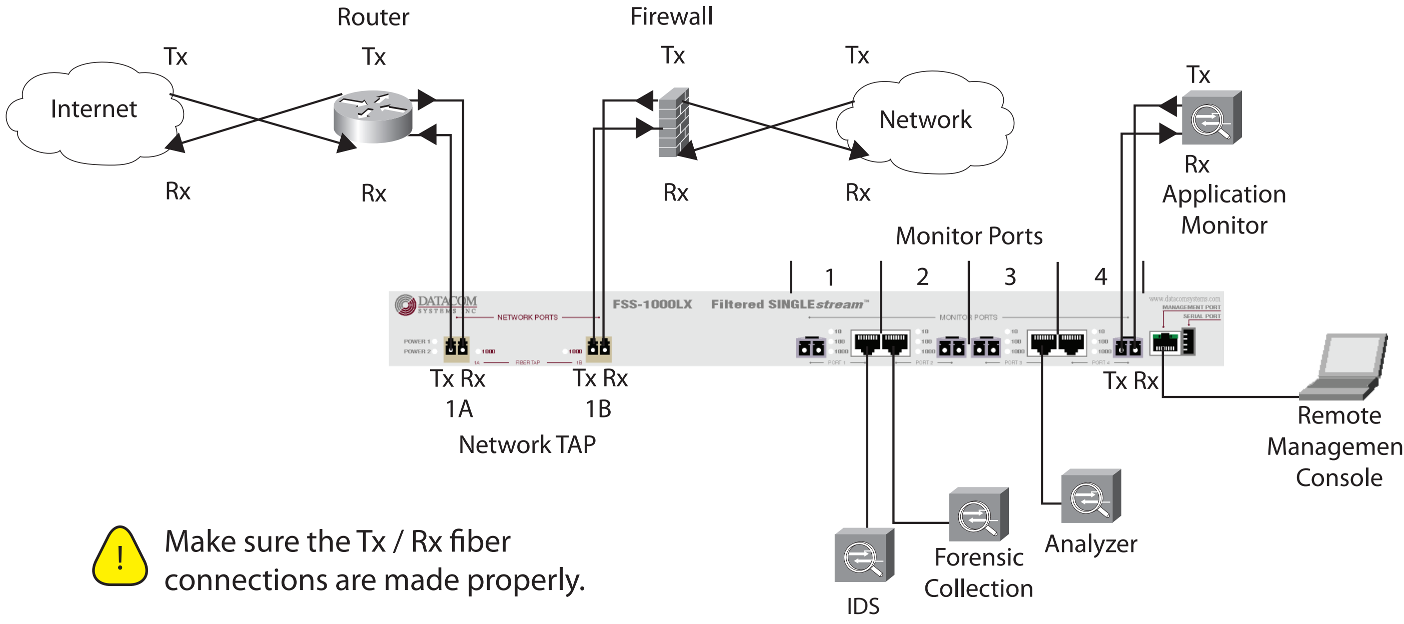


Figure 2.11 FSS-2000LX with Two Fiber Network Taps

8. Connect a monitoring device to one of the Monitoring Ports, Monitor 1, 2, 3 or 4. Up to four monitoring devices can be connected to a Filtered SINGLE*stream*™ at one time. The Link LEDs indicate the monitoring device is connected properly and the speed of the link. **When using a Fiber Monitoring device make sure the Monitor Tx port is connected to the Rx port of the external network device; and ensure that the Monitor Rx port is connected to the Tx port of the external network device.**
9. Connect the Remote Management Network to the Management Port. The Link LEDs indicate the monitoring device is connected properly and the speed of the link.



Make sure the Tx / Rx fiber connections are made properly.

Figure 2.12 Fiber Network Tap using FSS-1000LX

2.3 Connecting Multiple Tap Connections Using a Single Network Tap

The Filtered SINGLE*stream*™ FSS-2000BT/SX and FSS-2000BT/LX models provide the capability to connect Fiber and/or 10/100/1000BaseT Network Taps. Notice that Network Tap 1 has two Port A connections and two Port B connections. One A and B pair is for the 10/100/1000BaseT Network Tap, while the other A and B pair is for the Fiber Network Tap. It is possible to connect both A and B pairs of a single Network Tap at the same time; however if this is done, only one of the A and B pairs can be actively monitored. Through the FLOW*control*™ software, the user can select which of the physically connected taps is active.

In the figure below, Network Tap 1 of an FSS-2000BT/LX model is connected to two physical networks. The hardware associated with Network Tap 1 can only be used to connect one active Network Tap at a time. In the setup below, only one of the connected network links can be actively monitored.

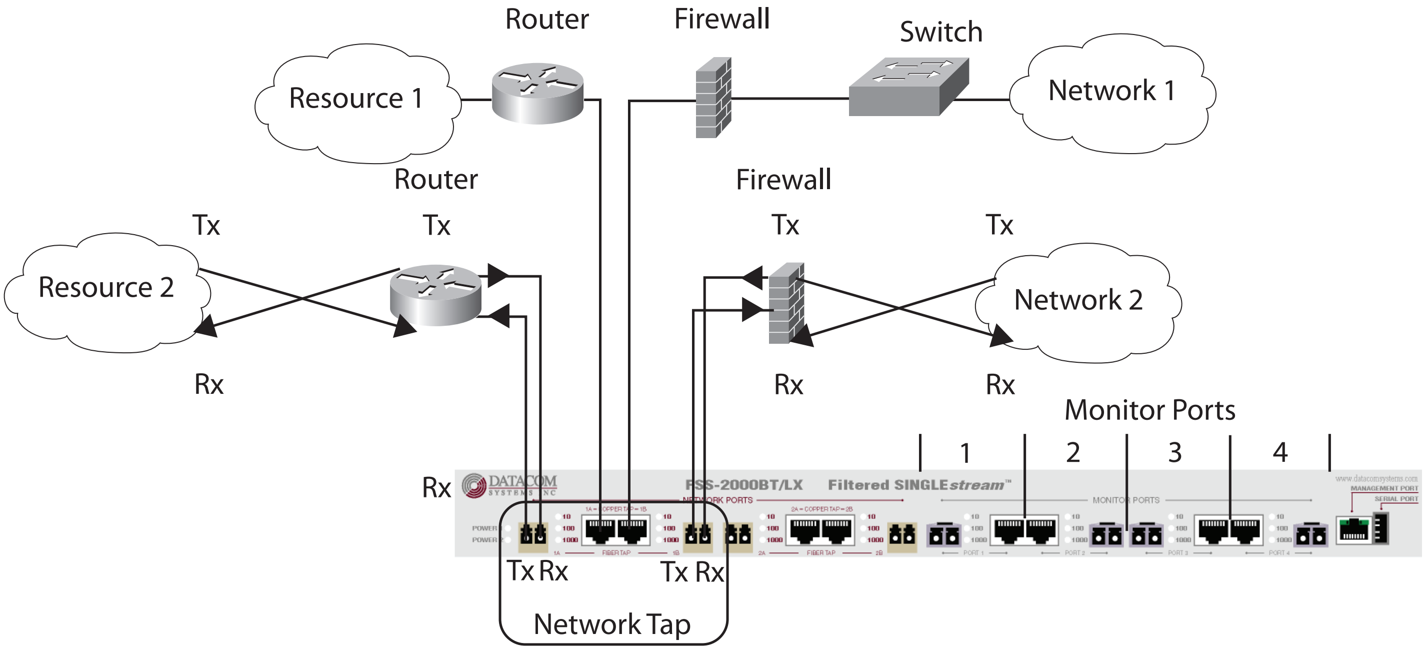


Figure 2.13 FSS-2000BT/LX Application

By default, the 10/100/1000BaseT Network Tap is the network link that is actively monitored. So, in the example above, Link 1 (the link between Resource 1 and Network 1) would be monitored. Link 2 (the link between Resource 2 and Network 2), while connected to the Filtered SINGLE*stream*™, would not be monitored in any way by default. Making both sets of connections is not a problem, though, because the Filtered SINGLE*stream*™ will allow the normal network traffic to pass across both links. Using the FLOW*control*™ software, the user can decide to stop monitoring the traffic on Link 1 and instead monitor the traffic on Link 2. The user must only make simple configuration changes, which can be done remotely.

2.4 Verify Proper Network Connections

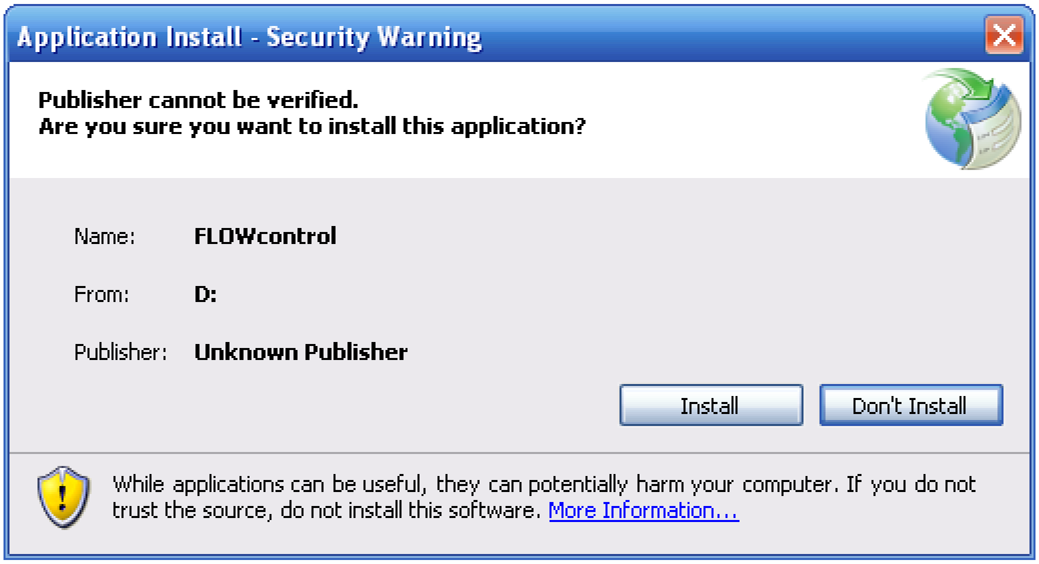
Once you have connected the desired Network Tap(s), verify that the normal network traffic is flowing across the newly connected tap(s). Even when the Filtered SINGLE*stream*™ is not connected to a power source, the original network link should function just as it did prior to connecting the Network Tap. Traffic will not flow to the Monitor Ports until the Filtered SINGLE*stream*™ is configured using FLOW*control*™. Check the status of each of the external devices to ensure normal link connections indicators.

Now that your Network Tap has been connected, you are ready to begin configuring your Filtered SINGLE*stream*™ to filter and route the desired network traffic to the specified monitoring devices.

3 Installing the FLOW*control*™ Software

The FLOW*control*™ software is used to configure the Filtered SINGLE*stream*™. This section covers the installation of the FLOW*control*™ software application.

1. Insert the FLOW*control*™ CD into your computer's CD-ROM drive.
2. Browse to your computer's CD-ROM drive. Double click on the **setup** application to begin installation.
3. Some computers are protected against unverified applications. FLOW*control*™ is a safe and secure application. Click **Install** to continue the installation process.



Application Install - Security Warning

Publisher cannot be verified.
Are you sure you want to install this application?

Name: **FLOWcontrol**

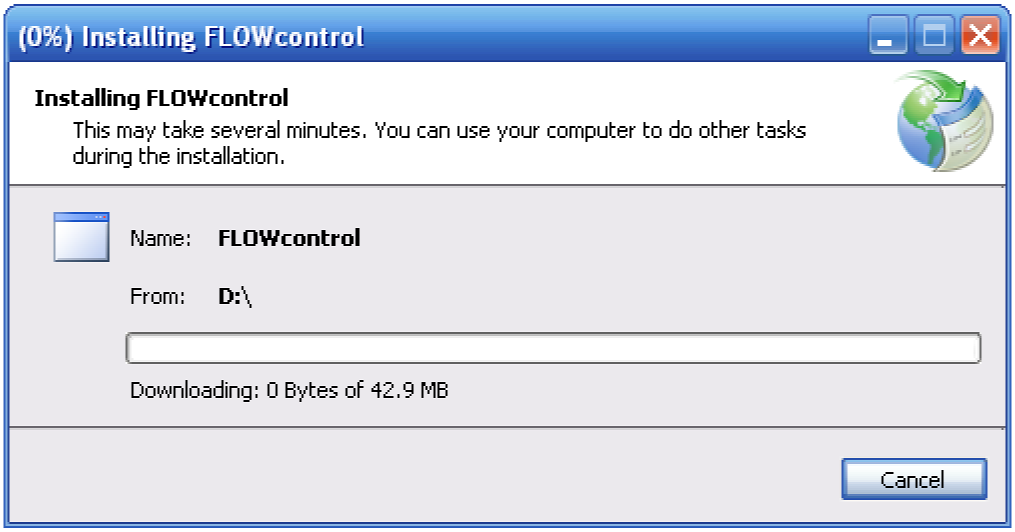
From: **D:**

Publisher: **Unknown Publisher**

While applications can be useful, they can potentially harm your computer. If you do not trust the source, do not install this software. More Information...

Figure 3.1 FLOWcontrol™ Security Warning

4. A progress bar shows the status of the installation.



(0%) Installing FLOWcontrol

Installing FLOWcontrol
This may take several minutes. You can use your computer to do other tasks during the installation.

Name: **FLOWcontrol**

From: **D:**

Downloading: 0 Bytes of 42.9 MB

Figure 3.2 FLOWcontrol™ Installation Status

5. Congratulations, you have successfully installed FLOW*control*™. FLOW*control*™ starts automatically after installation. The FLOW*control*™ icon is displayed while the application is launched on your computer.

Figure 3.3 FLOWcontrol™ Startup Icon

6. You are at the FLOW*control*™ main screen. Refer to Section 5, Using the FLOW*control*™ Software, to learn how to use the FLOW*control*™ application.

The default username is `Administrator` and the default password is `admin`. The Administrator has "super-user" privileges and can limit access by other accounts. See the Utilities Pull-down Menu section for changing user account information.

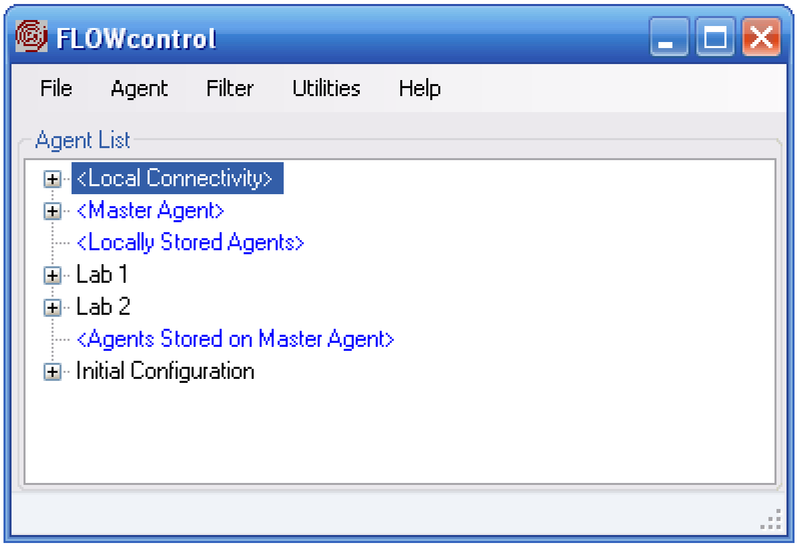


Figure 3.4 FLOWcontrol™ Main Screen

Quick Tips: Configuring the IP Address of a Filtered SINGLE***stream*™**

- You may want to record the IP address(es) of your Filtered SINGLE*stream(s)* **™** here for easy reference in the future:

Location	Sub-Location	FSS Model Number	IP Address

- You may want to record your Username and Password information here for easy reference in the future:

USERNAME: ______________________________

PASSWORD: ______________________________

- You may connect your PC to your Filtered SINGLE*stream*™
  - With the provided serial cable & HyperTerminal
  - With the provided serial cable & the FLOW*control*™ software
  - With a cross-connect LAN cable & the FLOW*control*™ software

- An agent stores the specific connection information that your PC uses to connect to a Filtered SINGLE*stream*™**.**

- Default agents allow for serial connections to the Filtered SINGLE*stream*™

- Additional agents must be created to allow for LAN connections

- This section provides information on configuring the IP address only. For more information regarding the creation of connection agents see Section 5.1.

- The default IP Address for the Filtered SINGLE*stream*™ is: 192.168.1.1. This address will most likely need to be modified in order for the Filtered SINGLE*stream*™ to be available via your local network.

- The default user name is `Administrator`, and default password is `admin`

4 Configuring the IP Address of a Filtered SINGLE*stream*™

The Filtered SINGLE*stream*™ is assigned an IP address by default. It is likely that the IP address must be changed before the Filtered SINGLE*stream*™ can be integrated into your local network. . A new IP address can be assigned using Microsoft's HyperTerminal or FLOW*control*™.

TIP The initial setup, according to the Quick-Installation Guide, may have already been completed. If your Filtered SINGLE*stream*™ already has an IP address for your network, please turn to Section 5, Using the FLOW*control*™ Software.

If you need to modify the IP address of your Filtered SINGLE*stream*™, continue with one of the Configurint the IP Address sections below.

4.1 Configuring the IP Address – HyperTerminal

The IP address of your Filtered SINGLE*stream*™ can be configured via a serial connection. A serial connection can be made with Microsoft's HyperTerminal application that is typically available on Windows PCs.

1. First, you must connect your PC and your Filtered SINGLE*stream*™. Using the provided cable (Datacom Systems Cable #DRL434-6), connect the 9-pin end to the serial port on your PC, and connect USB end to the serial port on your Filtered SINGLE*stream*™ as shown below:

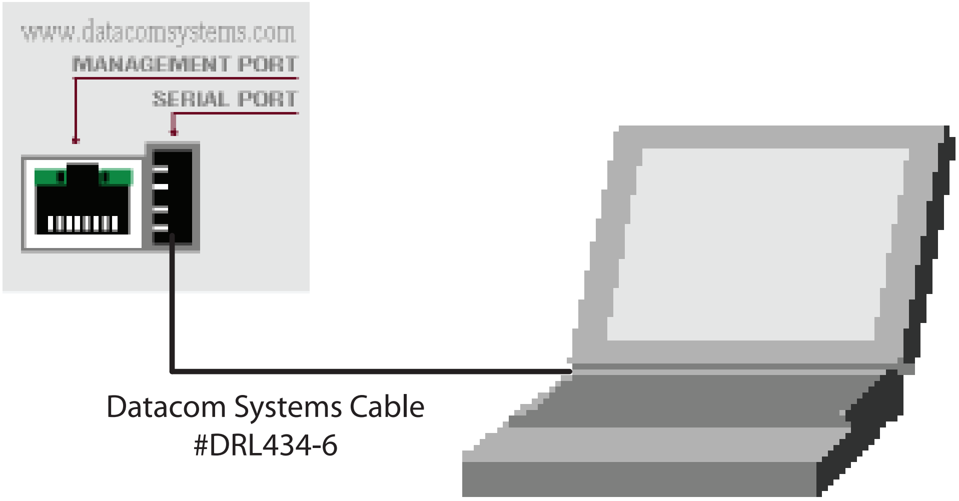
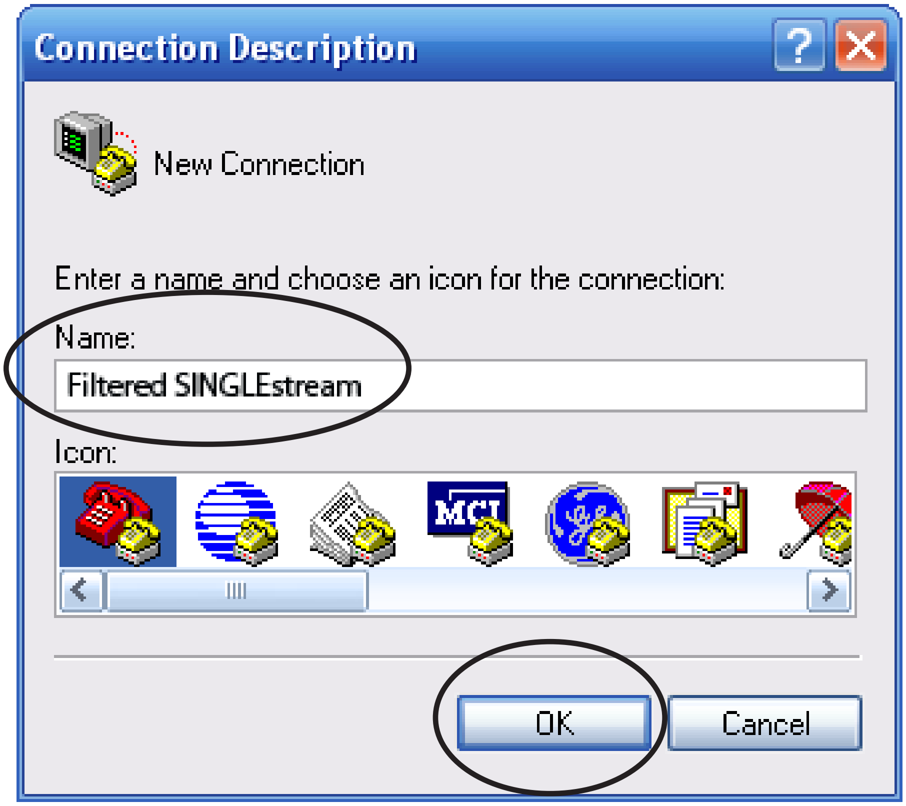


Figure 4.1 FSS Serial Connection using HyperTerminal

2. Open the HyperTerminal Application on your PC by selecting **Start** → **All Programs** → **Accessories** → **Communications** → **HyperTerminal**

3. Name a New HyperTerminal Connection

   Click **OK**.



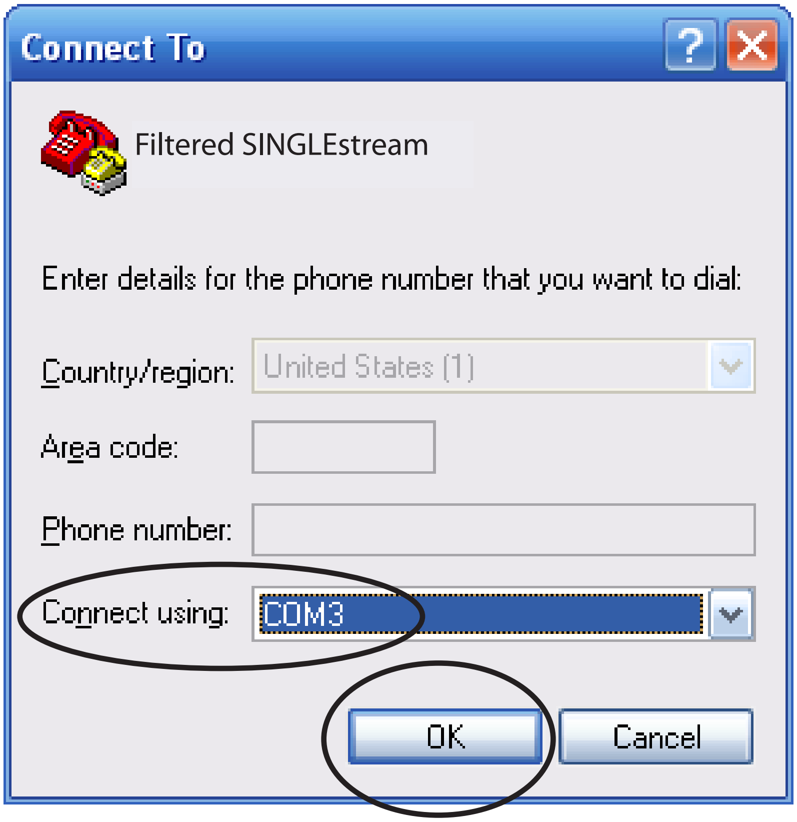
Enter a name and choose an icon for the connection:

Name: Filtered SINGLEstream

Figure 4.2 HyperTerminal Connection Description Window

4. On the **Connect To** window, create a serial link by selecting the COM port assigned to the Serial Port on your PC from the **Connect Using** pull-down menu.

   Click **OK**.

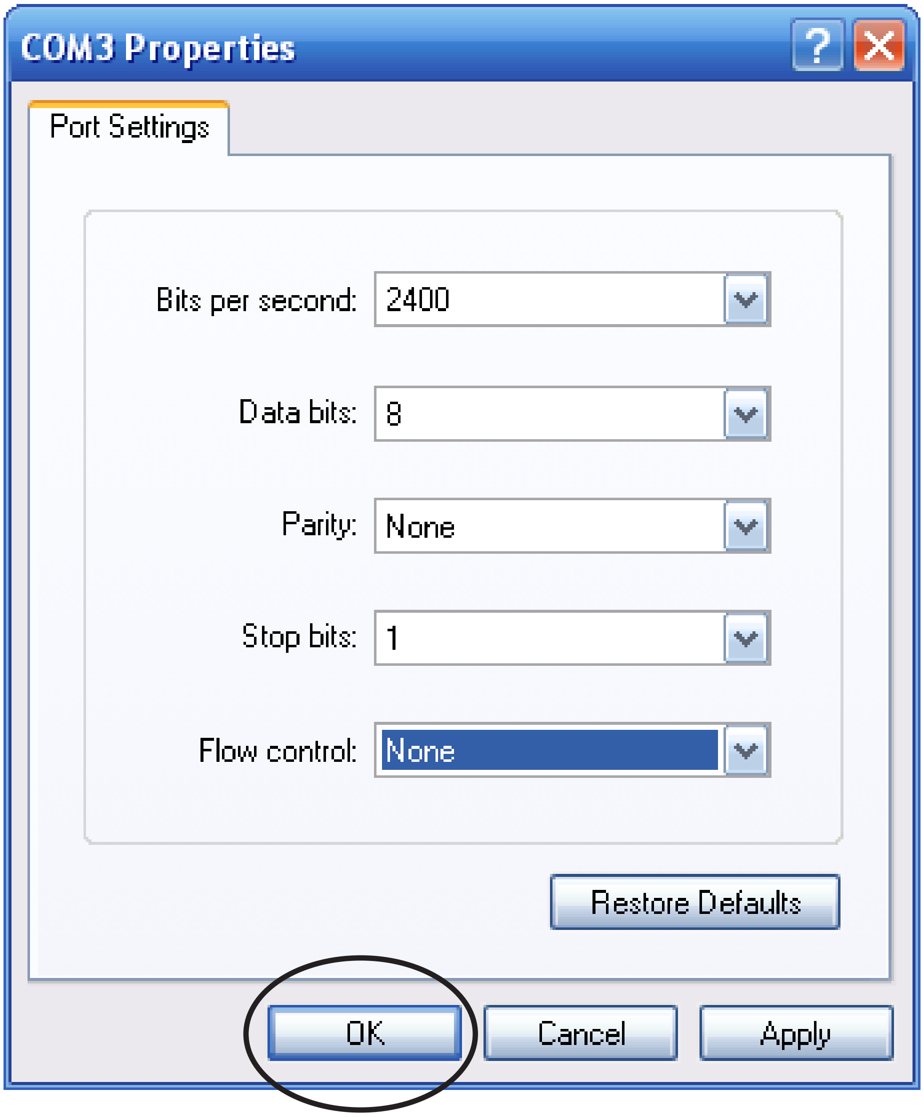


Connect To
Filtered SINGLEstream
Enter details for the phone number that you want to dial:
Country/region: United States (1)
Area code:
Phone number:
Connect using: COM3
OK
Cancel

Figure 4.3 HyperTerminal Connect To Window

5. Next, configure the **COM Properties**. The correct settings to communicate with your Filtered SINGLE*stream*™ are shown below.

   Once all settings are configured correctly, click **Apply**, and then click **OK**.



COM3 Properties

Port Settings

Bits per second: 2400

Data bits: 8

Parity: None

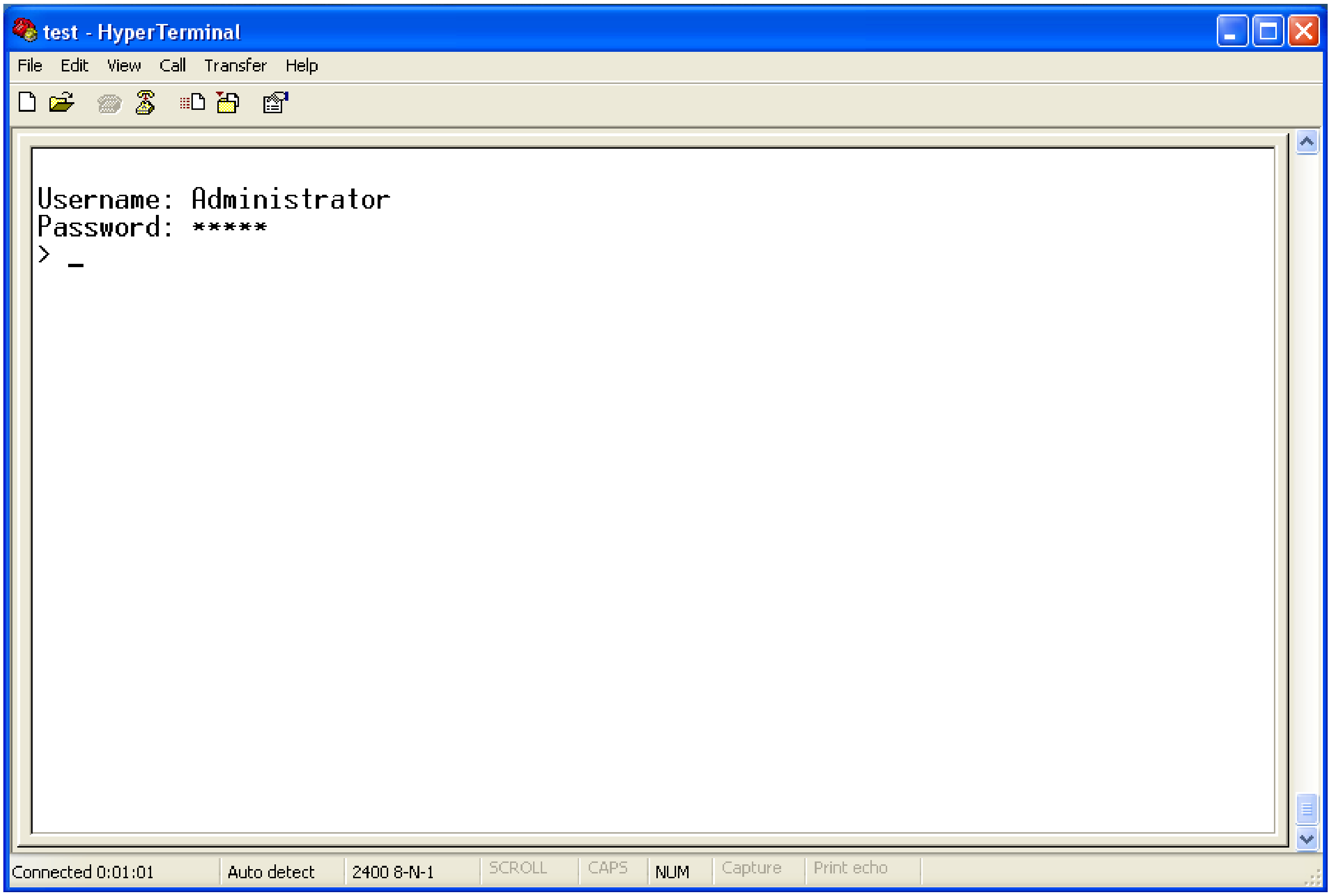
Stop bits: 1

Flow control: None

Figure 4.4 HyperTerminal COM Properties Window

6. Login into the Filtered SINGLE*stream*™. The default user name is `Administrator` and the default password is `admin`.

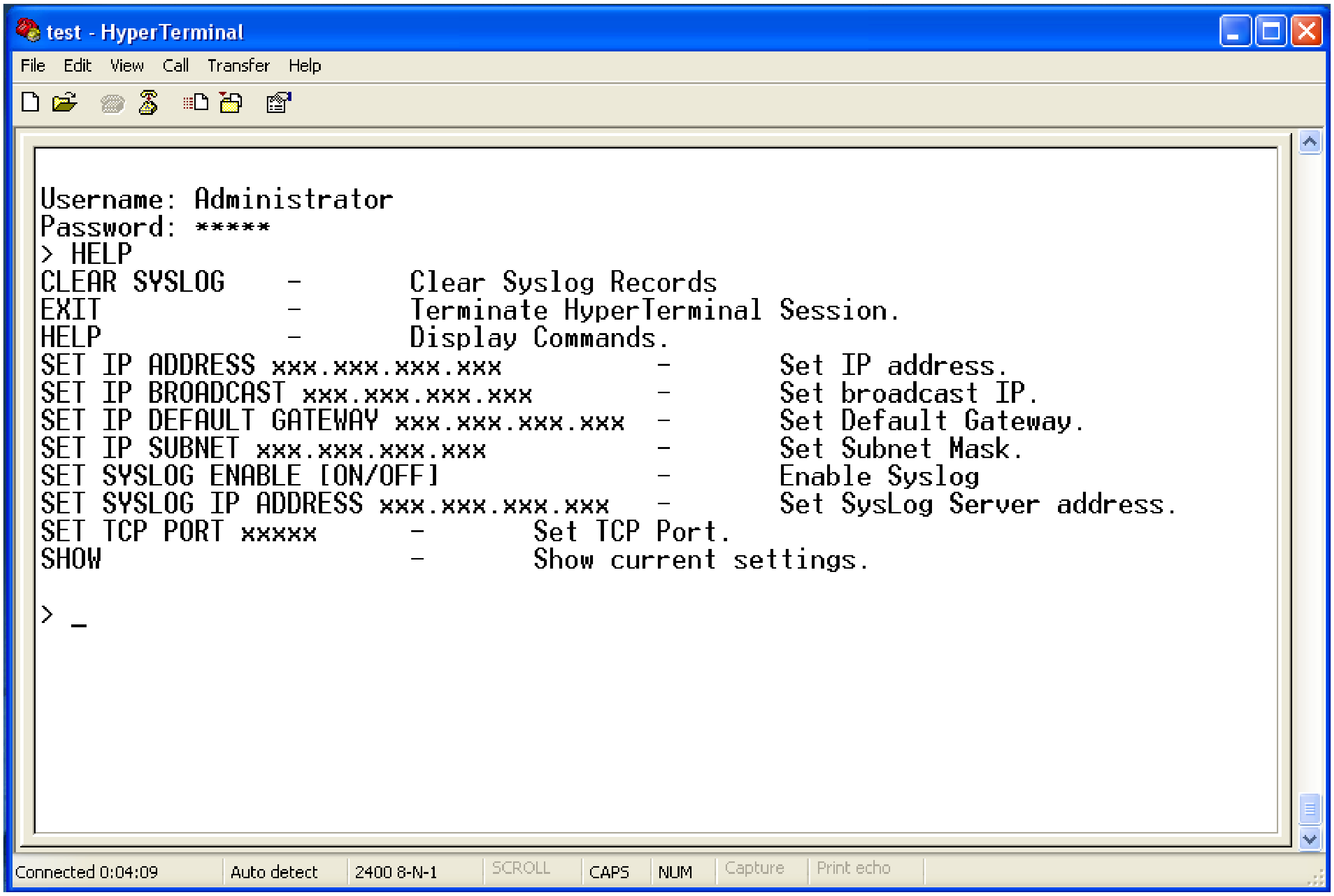
TIP Sometimes it is necessary to press <*ENTER*> once to obtain the HyperTerminal prompt.



```
Username: Administrator
Password: *****
> _
```

Figure 4.5 FSS HyperTerminal Login Window

7. You are now connected to your Filtered SINGLE*stream*™ . Type `HELP` to see a list of available commands.



```
Username: Administrator
Password: *****
> HELP
CLEAR SYSLOG    -       Clear Syslog Records
EXIT            -       Terminate HyperTerminal Session.
HELP            -       Display Commands.
SET IP ADDRESS xxx.xxx.xxx.xxx          -       Set IP address.
SET IP BROADCAST xxx.xxx.xxx.xxx        -       Set broadcast IP.
SET IP DEFAULT GATEWAY xxx.xxx.xxx.xxx  -       Set Default Gateway.
SET IP SUBNET xxx.xxx.xxx.xxx           -       Set Subnet Mask.
SET SYSLOG ENABLE [ON/OFF]              -       Enable Syslog
SET SYSLOG IP ADDRESS xxx.xxx.xxx.xxx   -       Set SysLog Server address.
SET TCP PORT xxxxx      -       Set TCP Port.
SHOW                    -       Show current settings.

> _
```

Figure 4.6 FSS Commands Window

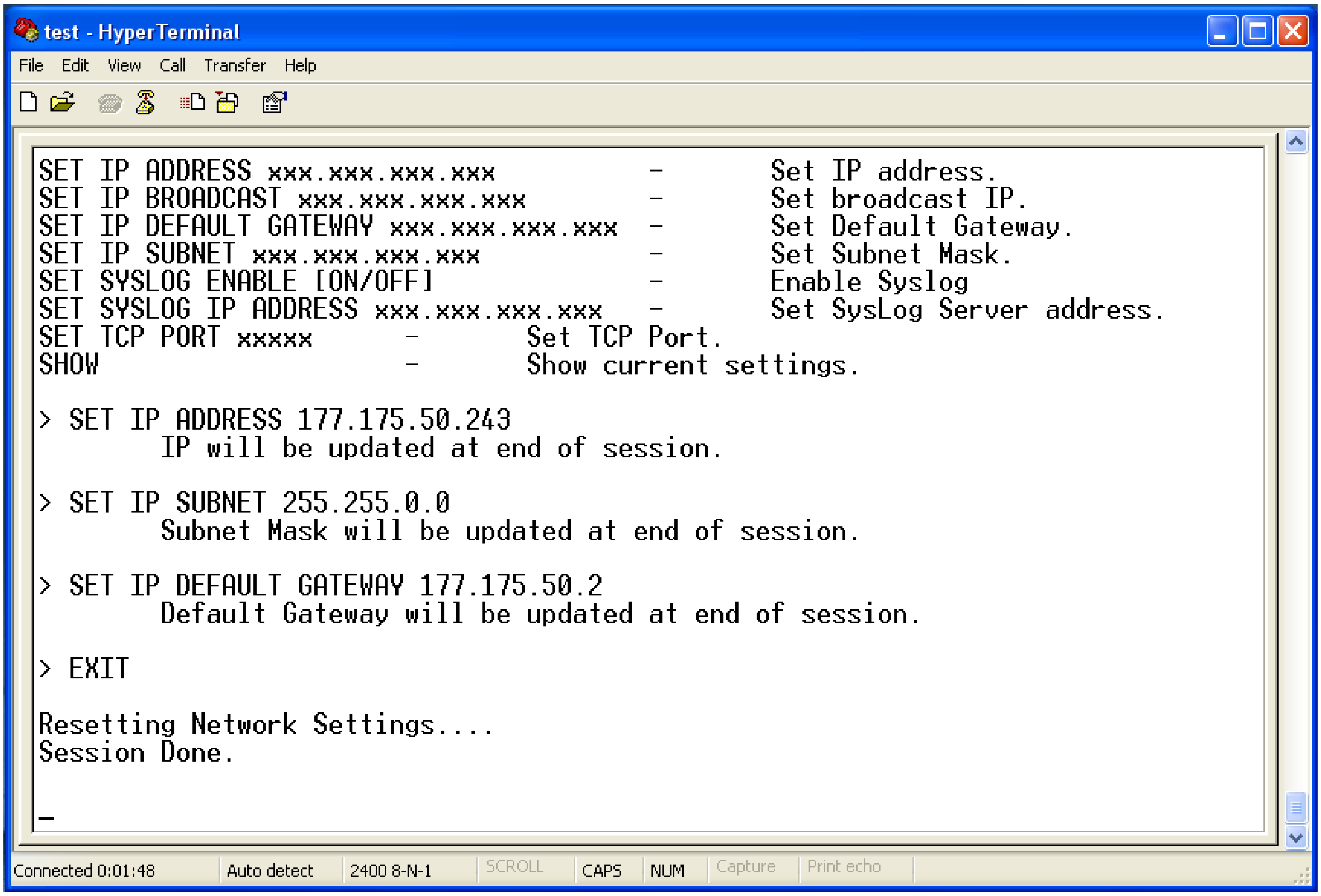
8. Set the IP address by typing `SET IP ADDRESS x.x.x.x` where x.x.x.x corresponds to a valid ip address for your network. Press <*ENTER*> to continue.

9. Set the subnet mask by typing `SET IP SUBNET x.x.x.x` where x.x.x.x corresponds to your network's subnet mask. Press <*ENTER*> to continue.

10. Set the default gateway (if needed) by typing `SET IP DEFAULT GATEWAY x.x.x.x`, where x.x.x.x corresponds to your network's default gateway. Press <*ENTER*> to continue.

11. Type `EXIT` to save the network address changes and reboot the Filtered SINGLE*stream*™.

TIP During the reboot process (approximately 45 seconds), several unreadable characters will be displayed in the HyperTerminal window. These characters can be ignored.

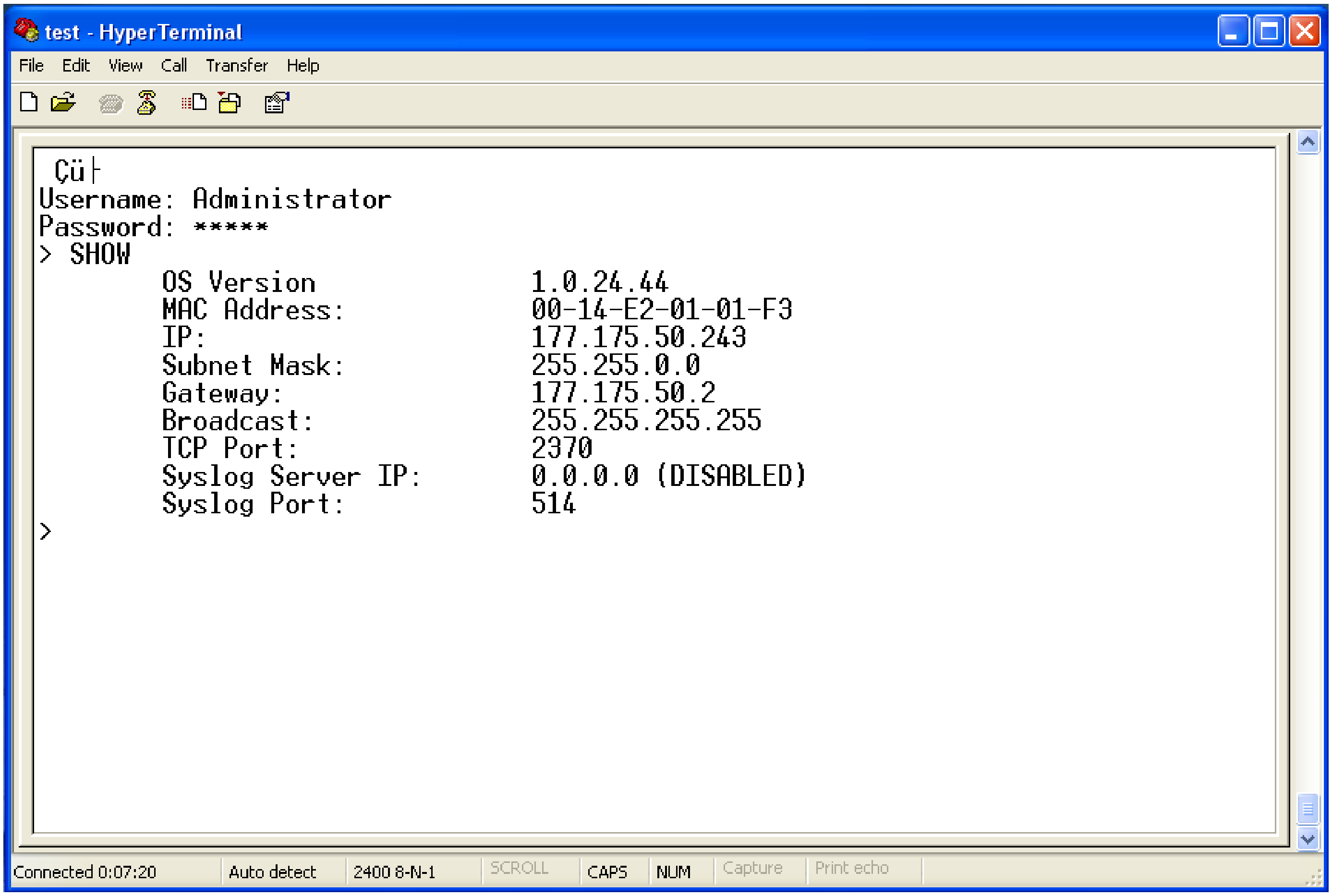


```
SET IP ADDRESS xxx.xxx.xxx.xxx          -       Set IP address.
SET IP BROADCAST xxx.xxx.xxx.xxx        -       Set broadcast IP.
SET IP DEFAULT GATEWAY xxx.xxx.xxx.xxx  -       Set Default Gateway.
SET IP SUBNET xxx.xxx.xxx.xxx           -       Set Subnet Mask.
SET SYSLOG ENABLE [ON/OFF]              -       Enable Syslog
SET SYSLOG IP ADDRESS xxx.xxx.xxx.xxx   -       Set SysLog Server address.
SET TCP PORT xxxxx      -       Set TCP Port.
SHOW                    -       Show current settings.

> SET IP ADDRESS 177.175.50.243
        IP will be updated at end of session.

> SET IP SUBNET 255.255.0.0
        Subnet Mask will be updated at end of session.

> SET IP DEFAULT GATEWAY 177.175.50.2
        Default Gateway will be updated at end of session.

> EXIT

Resetting Network Settings....
Session Done.


_
```

Figure 4.7 FSS IP Configuration Window

12. When the reboot is complete, the stream of characters will stop. At this time, press <**ENTER**>, and then type `SHOW` to review the network address settings. Verify that the settings are correct.

13. Disconnect the Serial Cable from your Filtered SINGLE*stream*™



```
 Çü├
Username: Administrator
Password: *****
> SHOW
        OS Version                1.0.24.44
        MAC Address:              00-14-E2-01-01-F3
        IP:                       177.175.50.243
        Subnet Mask:              255.255.0.0
        Gateway:                  177.175.50.2
        Broadcast:                255.255.255.255
        TCP Port:                 2370
        Syslog Server IP:         0.0.0.0 (DISABLED)
        Syslog Port:              514
>
```

Figure 4.8 FSS Show Window

4.2 Configuring the IP Address – FLOW*control*™, Serial Connection

The IP address of the Filtered SINGLE*stream*™ can also be modified using a serial connection with the FLOW*control*™ software application. Using FLOW*control*™ with a serial connection is only recommended during initial configuration.

1. First, you must connect your PC to your Filtered SINGLE*stream*™. Using the provided cable (Datacom Systems Cable #DRL434-6), connect the 9-pin end to the serial port on your PC, and connect USB end to the serial port on your Filtered SINGLE*stream*™ as shown below:

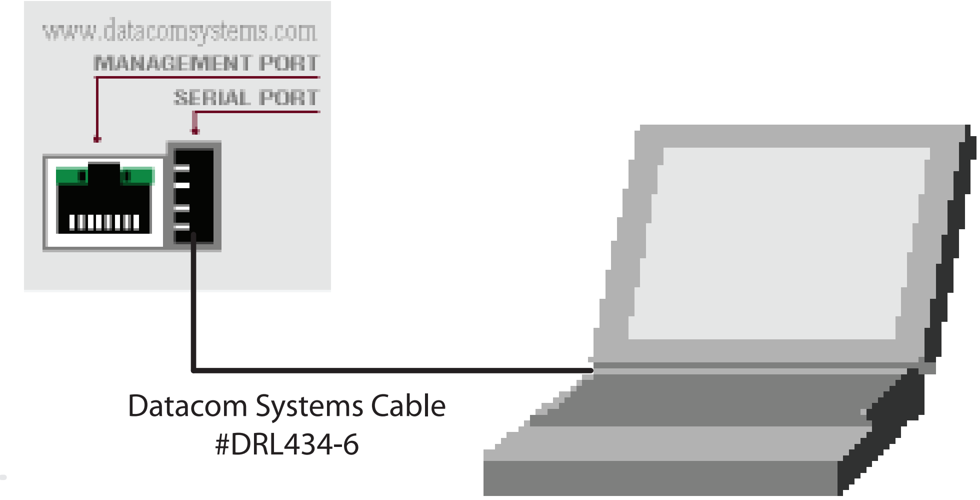


Figure 4.9 FSS Serial Connection

2. Start the FLOW*control*™ software application.

3. From the main FLOW*control*™ Main Window, expand Local Connectivity, then select the local COM port you are using on your PC.

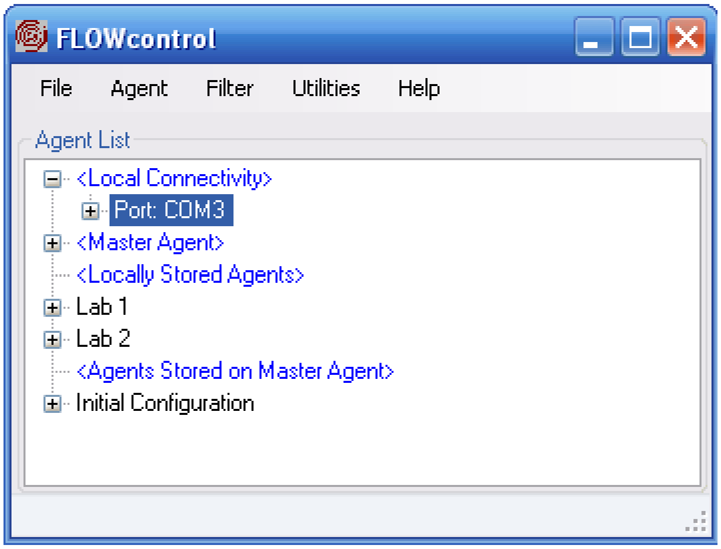
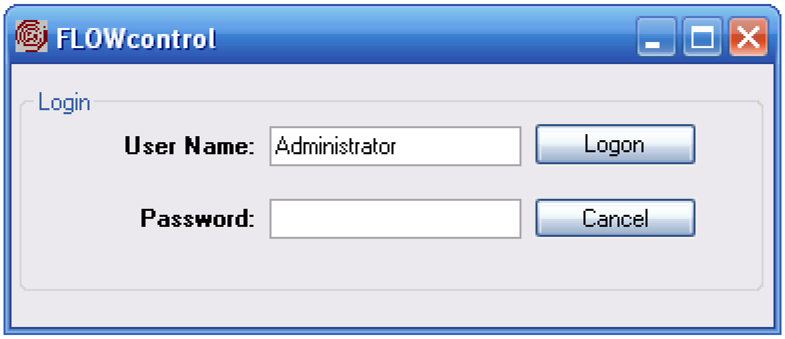


Figure 4.10 FLOWcontrol™ Local Connectivity

4. To connect using your PC's COM port, select **Agent** → **Connect**. You will be presented with the login screen. The default user name is `Administrator` and the default password is `admin`.



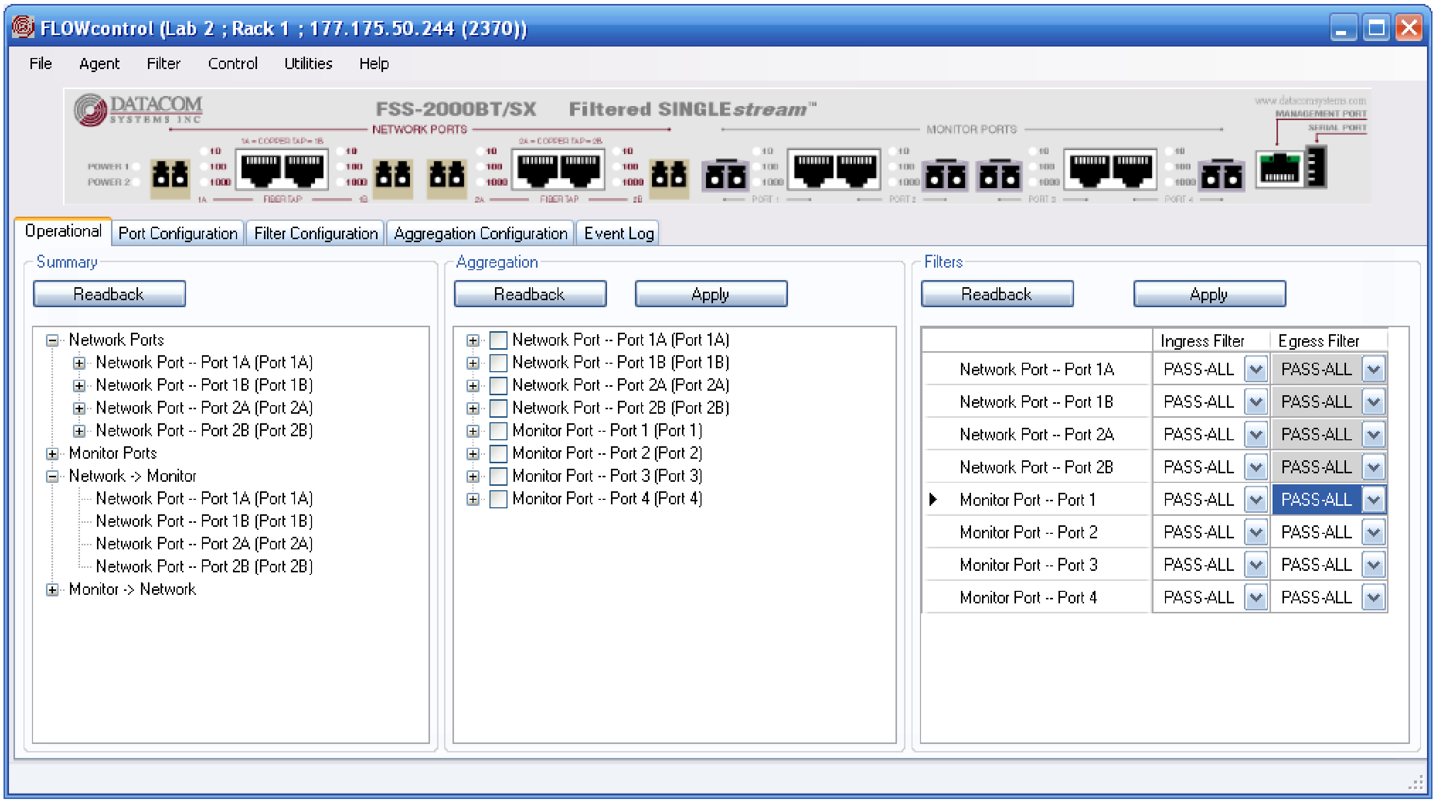
User Name: Administrator

Password:

Figure 4.11 FLOWcontrol™ Login Window

After logging in (approximately 150 seconds), the FLOW*control*™ the Main Window appears. An image of the Filtered SINGLE*stream*™ is displayed across the top of the window. The image displayed will automatically update to the correct image. An FSS-2000BT/SX is shown below.

TIP The FLOW*control*™ activity is shown across the bottom of the Main Window.



Summary

- Network Ports
  - Network Port -- Port 1A (Port 1A)
  - Network Port -- Port 1B (Port 1B)
  - Network Port -- Port 2A (Port 2A)
  - Network Port -- Port 2B (Port 2B)
- Monitor Ports
- Network -> Monitor
  - Network Port -- Port 1A (Port 1A)
  - Network Port -- Port 1B (Port 1B)
  - Network Port -- Port 2A (Port 2A)
  - Network Port -- Port 2B (Port 2B)
- Monitor -> Network

Aggregation

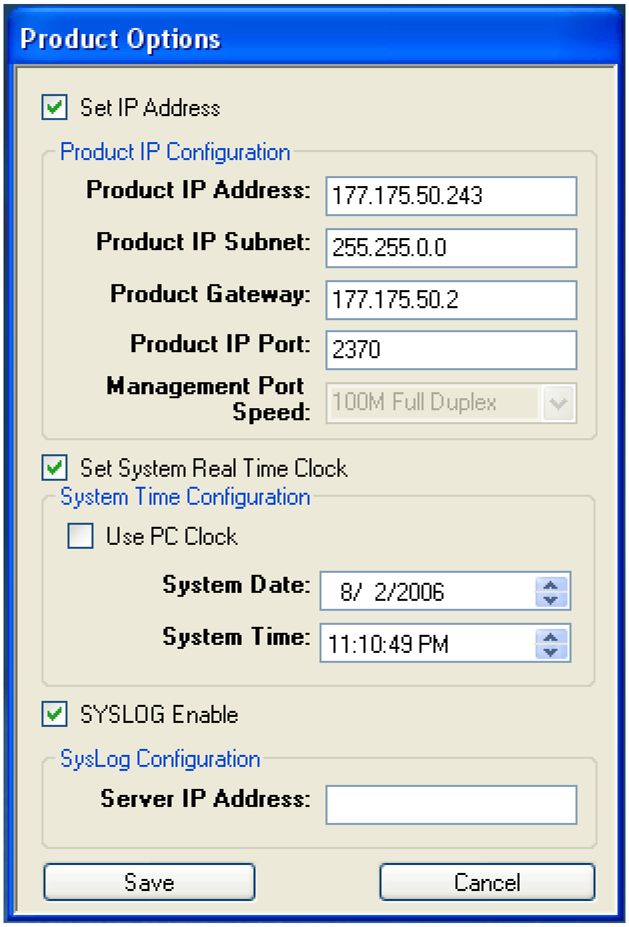
- □ Network Port -- Port 1A (Port 1A)
- □ Network Port -- Port 1B (Port 1B)
- □ Network Port -- Port 2A (Port 2A)
- □ Network Port -- Port 2B (Port 2B)
- □ Monitor Port -- Port 1 (Port 1)
- □ Monitor Port -- Port 2 (Port 2)
- □ Monitor Port -- Port 3 (Port 3)
- □ Monitor Port -- Port 4 (Port 4)

Filters

	Ingress Filter	Egress Filter
Network Port -- Port 1A	PASS-ALL	PASS-ALL
Network Port -- Port 1B	PASS-ALL	PASS-ALL
Network Port -- Port 2A	PASS-ALL	PASS-ALL
Network Port -- Port 2B	PASS-ALL	PASS-ALL
▶ Monitor Port -- Port 1	PASS-ALL	PASS-ALL
Monitor Port -- Port 2	PASS-ALL	PASS-ALL
Monitor Port -- Port 3	PASS-ALL	PASS-ALL
Monitor Port -- Port 4	PASS-ALL	PASS-ALL

Figure 4.12 FLOWcontrol™ Main Window Connected to an FSS-2000BT/SX

6. To correctly integrate your new Filtered SINGLE*stream*™ into your network, you must assign it a valid IP address for your network. To do this, select **Utilities** → **Options** to open the Product Options window.



Product Options

☑ Set IP Address

Product IP Configuration

Product IP Address: 177.175.50.243

Product IP Subnet: 255.255.0.0

Product Gateway: 177.175.50.2

Product IP Port: 2370

Management Port Speed: 100M Full Duplex

☑ Set System Real Time Clock

System Time Configuration

□ Use PC Clock

System Date: 8/ 2/2006

System Time: 11:10:49 PM

☑ SYSLOG Enable

SysLog Configuration

Server IP Address:

Figure 4.13 Product Options Window

7. Enter the desired IP address and subnet mask. If your network is segmented into multiple subnets, you may provide the Filtered SINGLE*stream*™ with a default gateway (such as the IP address of a local router) to use when communicating with non-local devices. If you don't need a default gateway, leave it blank.

8. Save the new information by clicking on **Save**.

9. From the FLOW*control*™ main window select **Agent** → **Disconnect** to disconnect the serial connection to the Filtered SINGLE*stream*™.

You must now create an agent that allows for communication between your PC and your new Filtered SINGLE*stream*™ via your LAN. Please refer to Section 5, Using the FLOW*control*™ Software, to create a connection agent.

4.3 Configuring the IP Address – FLOW*control*™, LAN Connection

If your PC does not have a 9-pin serial connection, you can perform the initial configuration of the Filtered SINGLE*stream*™ via an Ethernet LAN connection. To do this, you must be able to temporarily change the IP Address of your PC and you must have a cross-connect LAN cable.

1. The default IP address of a Filtered SINGLE*stream*™ is 192.168.1.1 with a netmask of 255.255.255.0.

TIP 192.168.1.1 / 24 specifies the IP address (192.168.1.1) and the netmask (/ 24). The "/ 24" netmask can also be written as "255.255.255.0".

2. Temporarily set the IP address of your PC to 192.168.1.2 / 24.
3. Connect your PC to the Filtered SINGLE*stream*™ via a cross-connect LAN cable.

TIP Some newer PCs may have Network Interface Cards that automatically detect when a cross-connection is necessary. In some cases, a cross-connect LAN cable will not work. If you have trouble establishing a connection between your PC and the Filtered SINGLE*stream*™, you may want to try using a normal (straight-through) LAN cable.

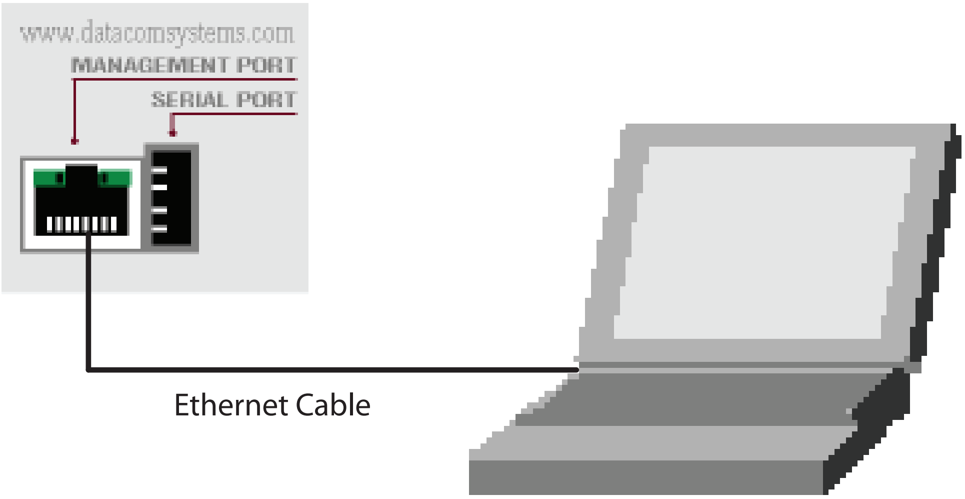


Figure 4.14 FSS Management Port Connection

4. Start the FLOW*control*™ software application.

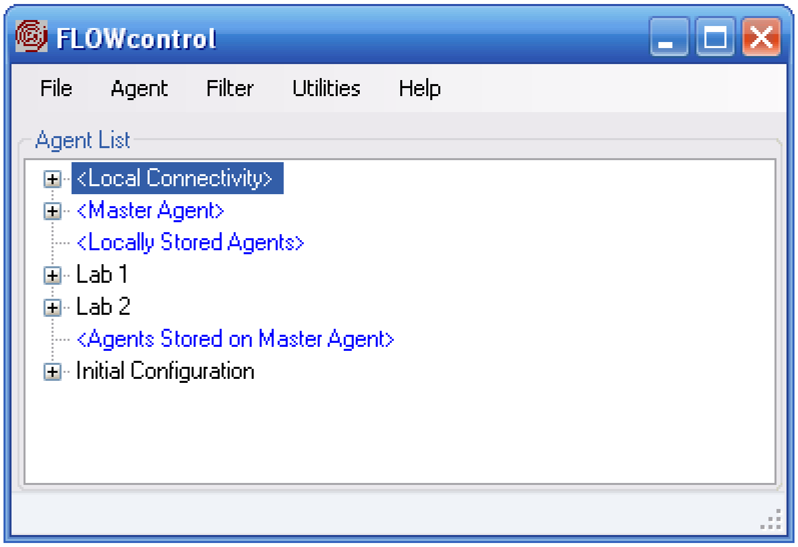
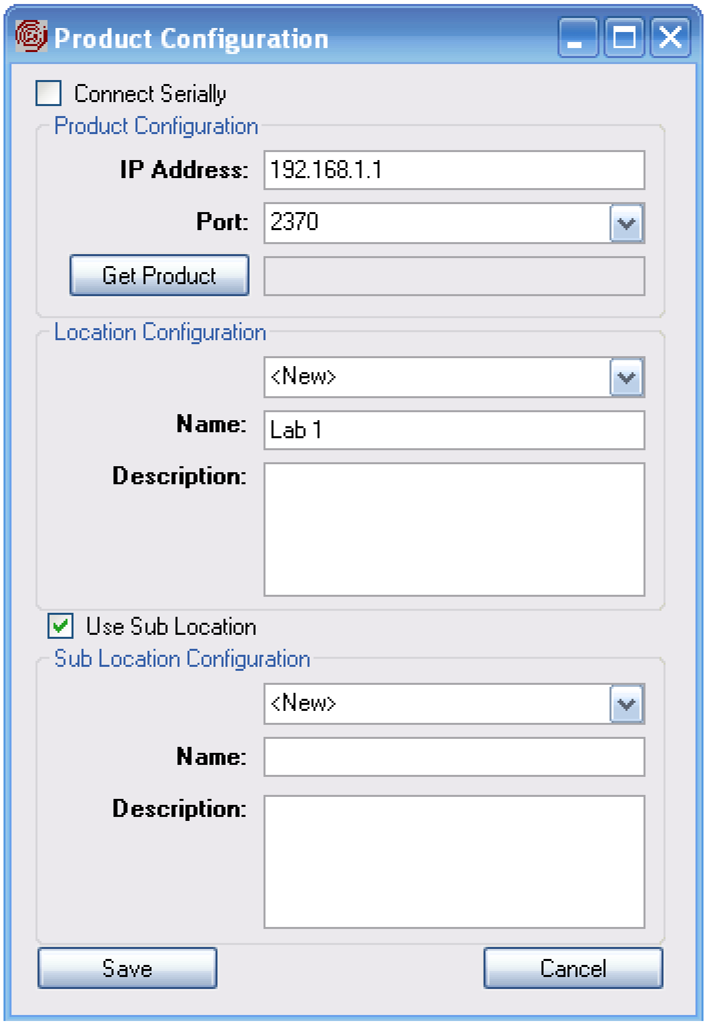


Figure 4.15 FLOWcontrol™ Main Window

5. To configure a new Filtered SINGLE*stream*™ you must first define a connection agent. Agents are connection profiles used by your PC to connect to various Filtered SINGLE*streams*™. To create your first agent, select **Agent** → **Add** to open the Product Configuration window and add a new agent. When using your Filtered SINGLE*stream*™ the first time, create an agent with the default IP address of the Filtered SINGLE*stream*™ (192.168.1.1). The IP address must be changed later to an appropriate IP address for your network. You may enter the desired location & sub-location information at this time, this information will help you distinguish one Filtered SINGLE*stream*™ from another.

⚠ The IP address must be changed later to an appropriate IP address for your network**.**

6. Enter the default IP Address (192.168.1.1) and Port for your new agent on the Product Configuration window as shown below. Also you must enter a descriptive name for this connection agent. If you are on the same network as your Filtered SINGLE*stream*™ , the **Get Product** button retrieves the FSS model information. The location information will be user specific. If you will be installing and configuring several new Filtered SINGLE*streams*™, then you may wish to name this agent "New_FSS_Install" so you can re-use it later.



Product Configuration

☐ Connect Serially

Product Configuration

IP Address: 192.168.1.1

Port: 2370

Location Configuration

<New>

Name: Lab 1

Description:

☑ Use Sub Location

Sub Location Configuration

<New>

Name:

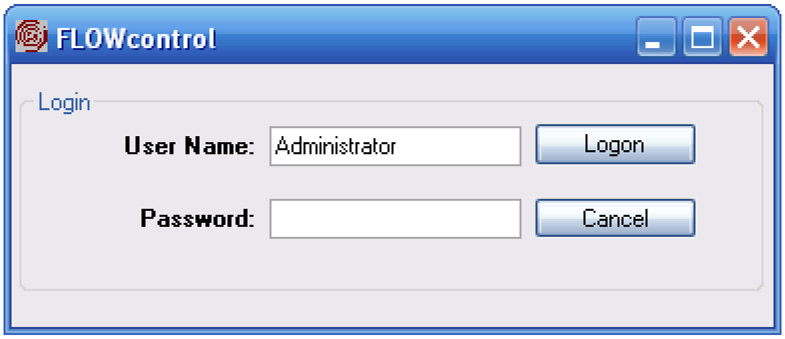
Description:

Figure 4.16 FLOWcontrol™ Product Configuration Window

7. When all the information has been entered correctly, select **Save**. This creates the new agent. Once a new agent is created, the agent will appear in the list of agents shown on the main FLOW*control*™ window.

8. To connect to a Filtered SINGLE*stream*™ using an agent, expand the list of agents until the IP Address and Port appear. Click on the desired **Address (Port):** and select **Agent** → **Connect**.

9. You will be presented with the login screen. The default username is **`Administrator`** and the default password is **`admin`**.

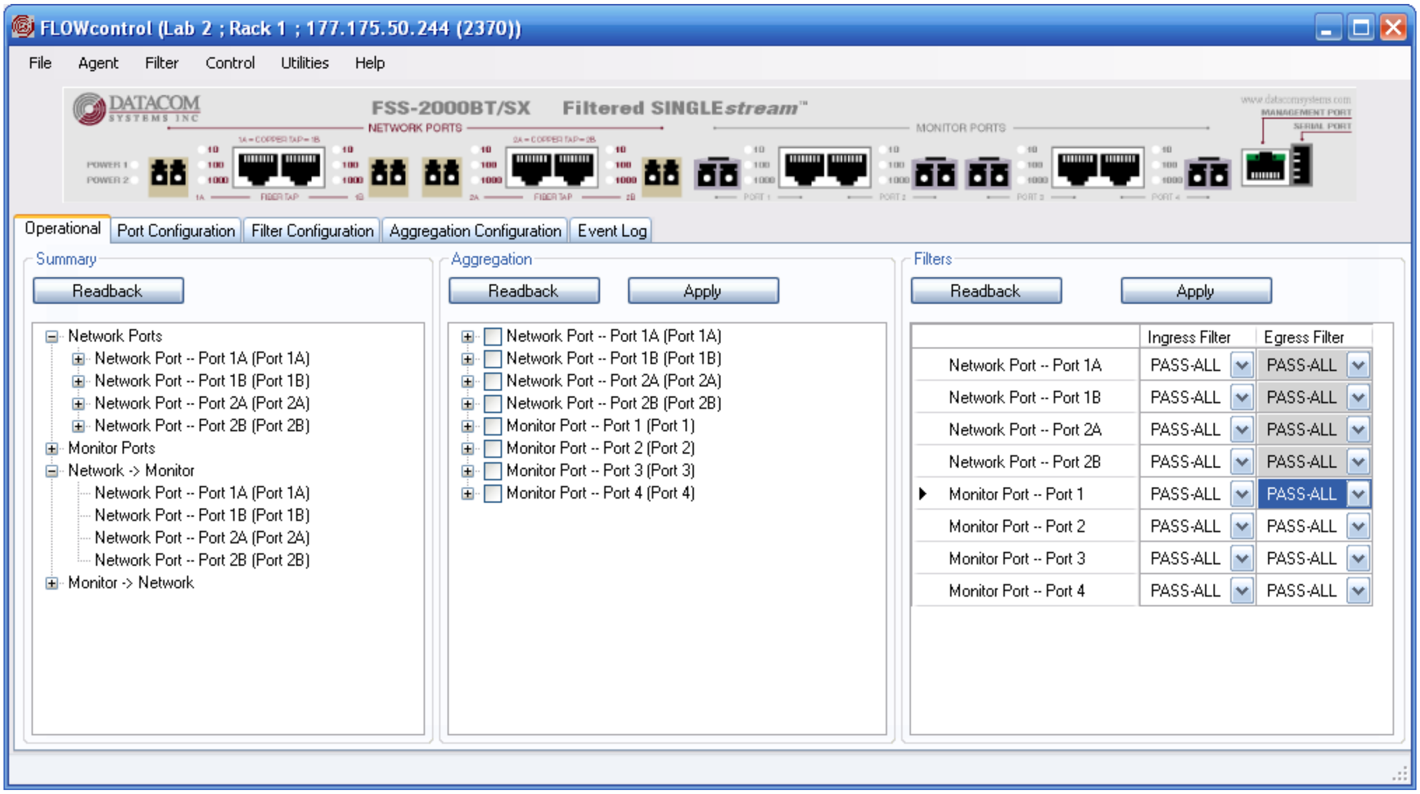


User Name: Administrator

Password:

Figure 4.17 FLOWcontrol™ Login Window

After logging in (approximately 8 seconds), the FLOW*control*™ the Main Window appears. An image of the Filtered SINGLE*stream*™ is displayed across the top of the window. The image displayed will automatically update to the correct image. An FSS-2000BT/SX is shown below.



Summary:

- Network Ports
  - Network Port -- Port 1A (Port 1A)
  - Network Port -- Port 1B (Port 1B)
  - Network Port -- Port 2A (Port 2A)
  - Network Port -- Port 2B (Port 2B)
- Monitor Ports
- Network -> Monitor
  - Network Port -- Port 1A (Port 1A)
  - Network Port -- Port 1B (Port 1B)
  - Network Port -- Port 2A (Port 2A)
  - Network Port -- Port 2B (Port 2B)
- Monitor -> Network

Aggregation:

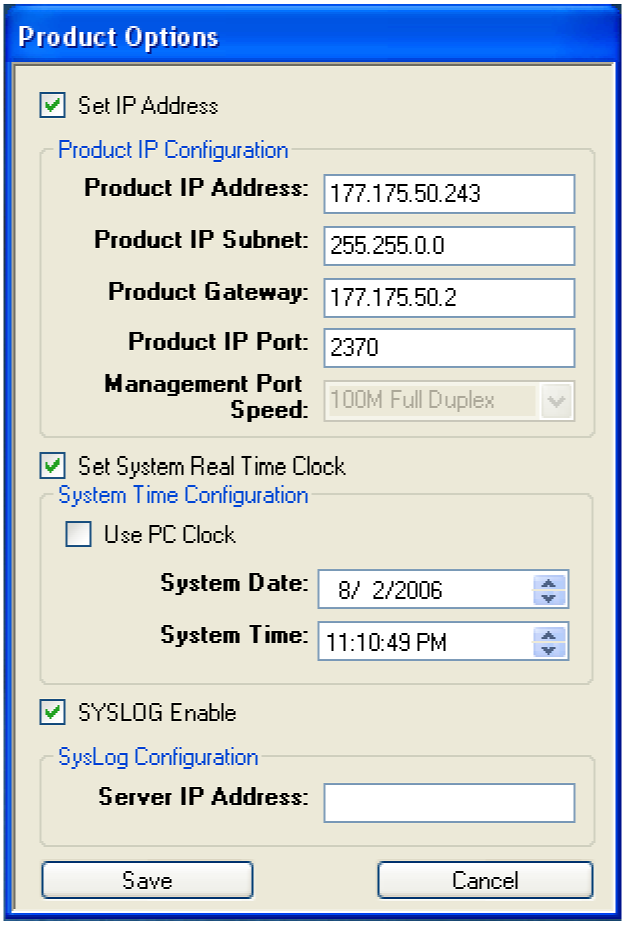
- □ Network Port -- Port 1A (Port 1A)
- □ Network Port -- Port 1B (Port 1B)
- □ Network Port -- Port 2A (Port 2A)
- □ Network Port -- Port 2B (Port 2B)
- □ Monitor Port -- Port 1 (Port 1)
- □ Monitor Port -- Port 2 (Port 2)
- □ Monitor Port -- Port 3 (Port 3)
- □ Monitor Port -- Port 4 (Port 4)

Filters:

	Ingress Filter	Egress Filter
Network Port -- Port 1A	PASS-ALL	PASS-ALL
Network Port -- Port 1B	PASS-ALL	PASS-ALL
Network Port -- Port 2A	PASS-ALL	PASS-ALL
Network Port -- Port 2B	PASS-ALL	PASS-ALL
Monitor Port -- Port 1	PASS-ALL	PASS-ALL
Monitor Port -- Port 2	PASS-ALL	PASS-ALL
Monitor Port -- Port 3	PASS-ALL	PASS-ALL
Monitor Port -- Port 4	PASS-ALL	PASS-ALL

Figure 4.18 Main FLOWcontrol™ Window Connected to an FSS-2000BT/SX

10. To correctly integrate your new Filtered SINGLE*stream*™ into your network, you must assign it a valid IP address for your network. To do this, select **Utilities** → **Options** to open the **Product Options** window.



Product Options

☑ Set IP Address

Product IP Configuration

Product IP Address: 177.175.50.243

Product IP Subnet: 255.255.0.0

Product Gateway: 177.175.50.2

Product IP Port: 2370

Management Port Speed: 100M Full Duplex

☑ Set System Real Time Clock

System Time Configuration

□ Use PC Clock

System Date: 8/ 2/2006

System Time: 11:10:49 PM

☑ SYSLOG Enable

SysLog Configuration

Server IP Address:

Figure 4.19 Product Options Window

11. Enter the desired IP address and subnet mask. If your network is segmented into multiple subnets, you may provide the FSS with a default gateway (such as the IP address of a local router) to use when communicating with non-local devices. If you don't need a default gateway, leave it blank.

12. Save the new information by clicking on **Save**.

13. Select **Agent** → **Disconnect** to disconnect from the Filtered SINGLE*stream*™. The FLOW*control*™ window should now be displayed.

Your Filtered SINGLE*stream*™ now has a unique IP address for your network. The agent needs to be updated to allow for communication between your PC and your new Filtered SINGLE*stream*™. When initially created, the agent made use of the default IP address of 192.168.1.1. You must change this IP address to the new address you assigned to your Filtered SINGLE*stream*™. Please refer to Section 5, Using the FLOW*control*™ Software, to update the connection agent.

5 Using the Filter Product Console Software

By now, you have created at least one Network Tap, installed the FLOW*control*™ software on your PC, and assigned an IP address to your Filtered SINGLE*stream*™. Now you are ready to define the routes and filters that will allow you to send tapped network traffic to your monitoring devices.

5.1 Creating a Connection Agent

Once your Filtered SINGLE*stream*™ has been installed and correctly configured with an IP address, you must create an agent on your PC using the FLOW*control*™ software. An agent is a local configuration that allows your PC to connect to the Filtered SINGLE*stream*™.

1. To create a new Agent, select **Agent** → **Add** from the main FLOW*control*™ window to bring up the Product Configuration window.

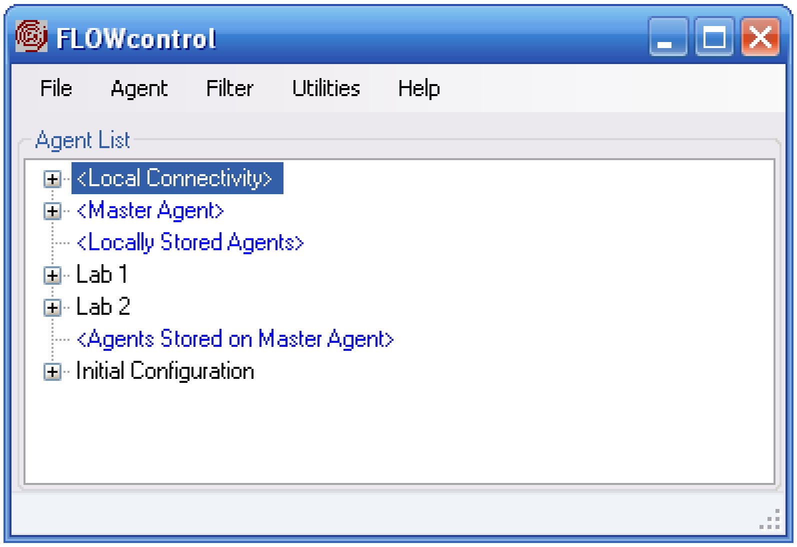
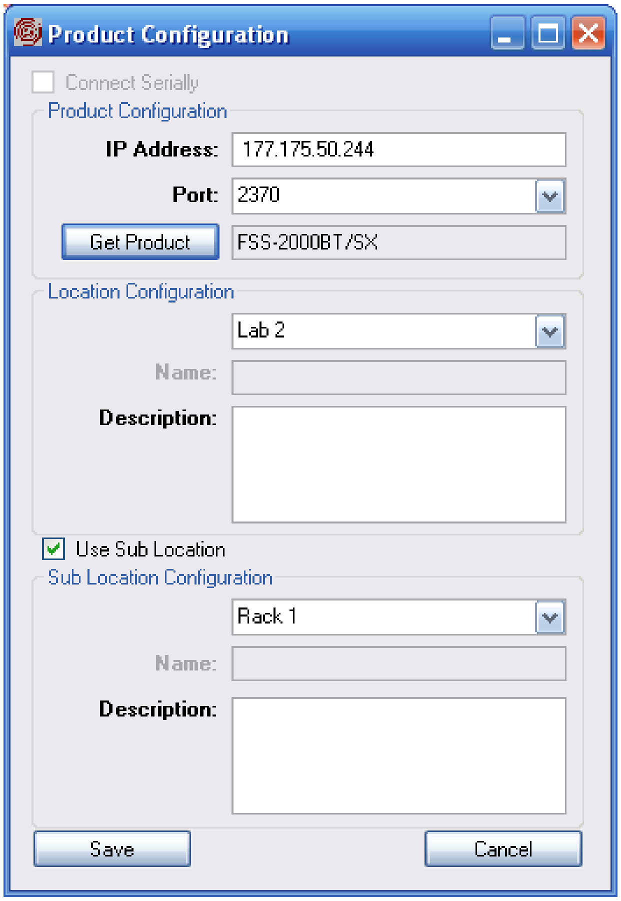


Figure 5.1 FLOWcontrol™ Main Window

2. Enter the IP address and Port for your new agent on the Product Configuration window as shown below. Also you must enter a descriptive name for this connection agent. If you are on the same network as your Filtered SINGLE*stream*™ , the **Get Product** button retrieves the FSS model information.


Product Configuration

□ Connect Serially

Product Configuration

IP Address: 177.175.50.244

Port: 2370

Get Product: FSS-2000BT/SX

Location Configuration

Lab 2

Name:

Description:

☑ Use Sub Location

Sub Location Configuration

Rack 1

Name:

Description:

Figure 5.2 FLOWcontrol™ Product Configuration Window

TIP The Location and Sub-Location information will be displayed on the main FLOW*control*™ window. Using descriptive terms here will allow you to easily keep track of all the Filtered SINGLE*streams*™ in your network.

3. When all the information has been entered correctly, select **Save.** This creates the new agent. Once a new agent is created, the agent names will appear in the list of agents shown on the main FLOW*control*™ window.

4. To connect to a Filtered SINGLE*stream*™, expand the list of agents on the Main Window. Select the **Address (Port):** of the desired Filtered SINGLE*stream*™. Select **Agent** → **Connect**.

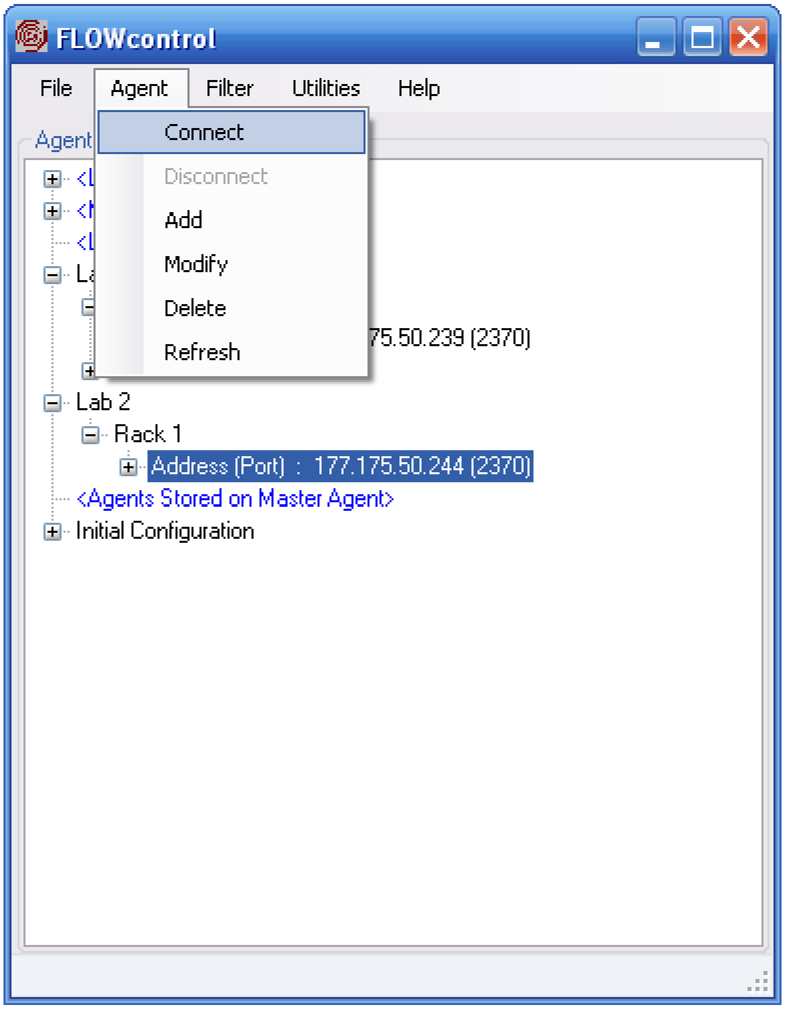
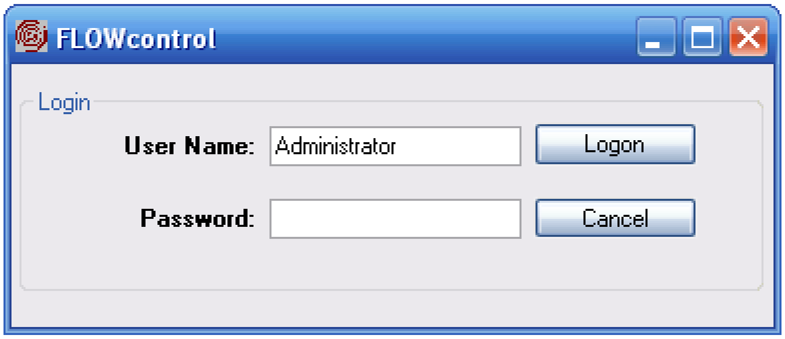


Figure 5.3 FLOWcontrol™ Agent → Connect

5. You will be presented with the login screen. The default username is `Administrator` and the default password is `admin`.

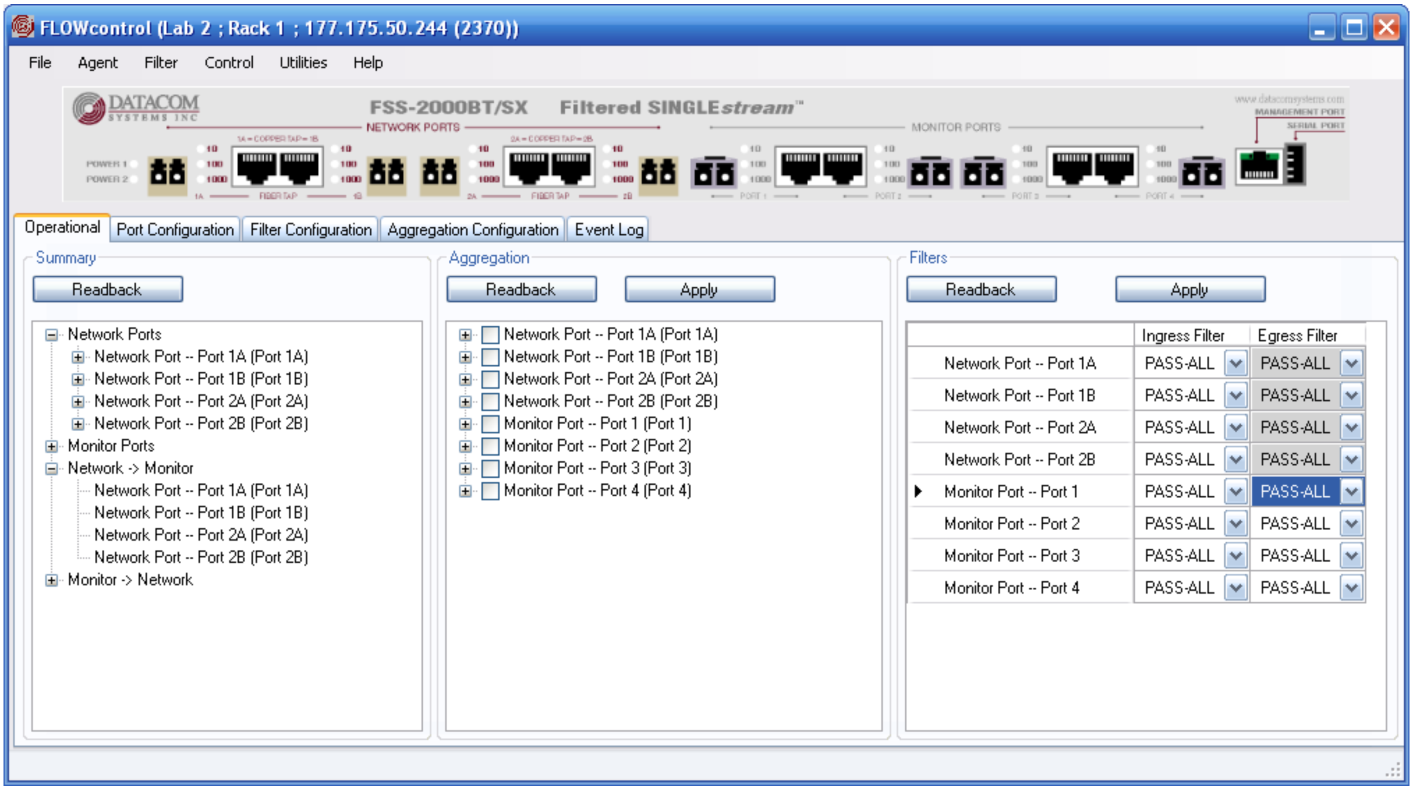


User Name: Administrator

Password:

Figure 5.4 FLOWcontrol™ Login Window

After logging in, the FLOW*control*™ the Main Window appears. An image of the Filtered SINGLE*stream*™ is displayed across the top of the window. The image displayed will automatically update to the correct image. An FSS-2000BT/SX is shown below.



Summary

```
⊟ Network Ports
   ⊞ Network Port -- Port 1A (Port 1A)
   ⊞ Network Port -- Port 1B (Port 1B)
   ⊞ Network Port -- Port 2A (Port 2A)
   ⊞ Network Port -- Port 2B (Port 2B)
⊞ Monitor Ports
⊟ Network -> Monitor
     Network Port -- Port 1A (Port 1A)
     Network Port -- Port 1B (Port 1B)
     Network Port -- Port 2A (Port 2A)
     Network Port -- Port 2B (Port 2B)
⊞ Monitor -> Network
```

Aggregation

```
⊞ □ Network Port -- Port 1A (Port 1A)
⊞ □ Network Port -- Port 1B (Port 1B)
⊞ □ Network Port -- Port 2A (Port 2A)
⊞ □ Network Port -- Port 2B (Port 2B)
⊞ □ Monitor Port -- Port 1 (Port 1)
⊞ □ Monitor Port -- Port 2 (Port 2)
⊞ □ Monitor Port -- Port 3 (Port 3)
⊞ □ Monitor Port -- Port 4 (Port 4)
```

Filters

	Ingress Filter	Egress Filter
Network Port -- Port 1A	PASS-ALL	PASS-ALL
Network Port -- Port 1B	PASS-ALL	PASS-ALL
Network Port -- Port 2A	PASS-ALL	PASS-ALL
Network Port -- Port 2B	PASS-ALL	PASS-ALL
▶ Monitor Port -- Port 1	PASS-ALL	PASS-ALL
Monitor Port -- Port 2	PASS-ALL	PASS-ALL
Monitor Port -- Port 3	PASS-ALL	PASS-ALL
Monitor Port -- Port 4	PASS-ALL	PASS-ALL

Figure 5.5 FLOWcontrol™ Main Window Connected to an FSS-2000BT/SX

5.2 Pull-down Menus

Upon login, the user is presented with the main FLOW*control*™ window. Six pull-down menus that control basic functions are always available across the top of the FLOW*control*™ main window. The pull-down menus (File, Agent, Filter, Control, Utilities, and Help) are described in this section.

5.2.1 File Pull-down Menu

The **File** pull-down has one option, **Exit**, which closes FLOW*control*™

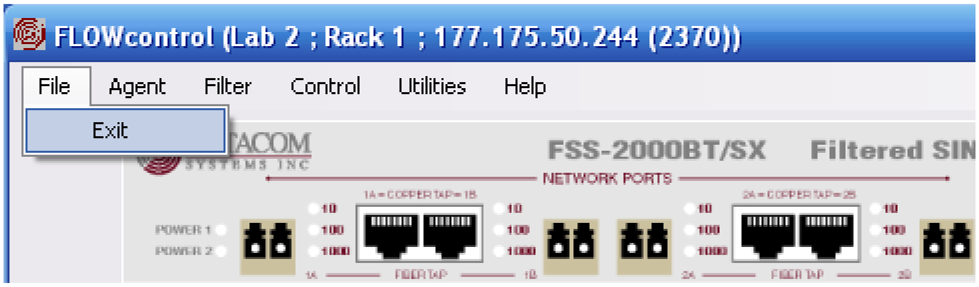


Figure 5.6 File Pull-down Menu

5.2.2 Agent Pull-down Menu

The **Agent** pull-down allows the user to open and close the connection between the PC and the Filtered SINGLE*stream*™.

Agent → {Connect, Disconnect}

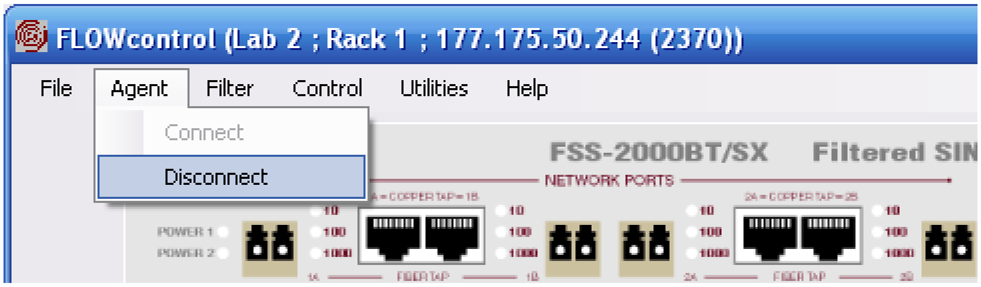


Figure 5.7 Agent Pull-down Menu

5.2.3 Filter Pull-down Menu

The **Filter** pull-down is used with the **Filter Configuration** tab to open, save, import and export filters. External filter files are stored as *.rec files (default file is filt.rec) and can only be used by the FLOW*control*™ software application. By exporting your filter definitions to a file, you could re-use them when you connected to another Filtered SINGLE*stream*™ device.

Filter → **Open** and **Save** are used to open and save both basic and advanced filters. These selections are only available when the **Filter Configuration** → **Basic** or **Advanced** tab is selected.

Filter → **Import** is used load filters saved on your PC. **Filter** → **Export** is used save the filters you create on your PC.

Filter → **{Open, Save, Filter Definitions** → **{Import, Export to File} }**

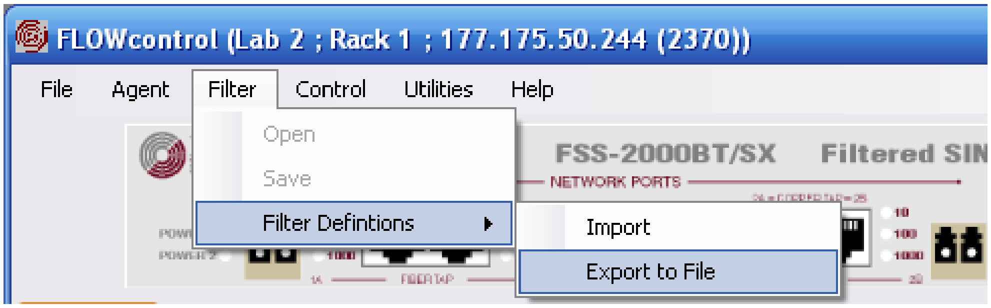


Figure 5.8 Filter Pull-down Menu

5.2.4 Control Pull-down Menu

The **Control** pull-down allows the user to apply new configuration settings to the connected Filtered SINGLE*stream*™ or readback the current settings from the connected Filtered SINGLE*stream*™. The configuration settings in question are dictated by the tab selected (**Operational, Port Configuration, Filter Configuration**, etc).

Control → **{Apply, Readback}**

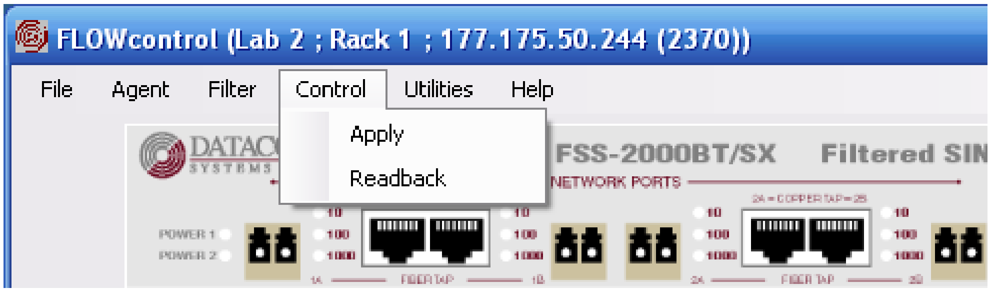


Figure 5.9 Control Pull-down Menu

5.2.5 Utilities Pull-down Menu

The Utilities pull-down allows the user to customize the connected Filtered SINGLE*stream*™.

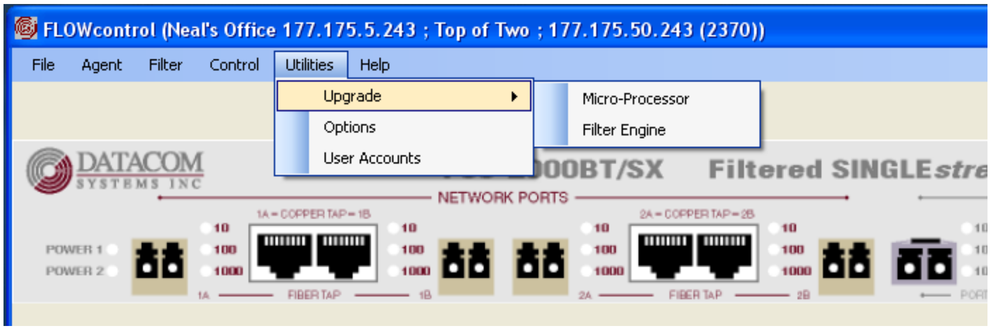
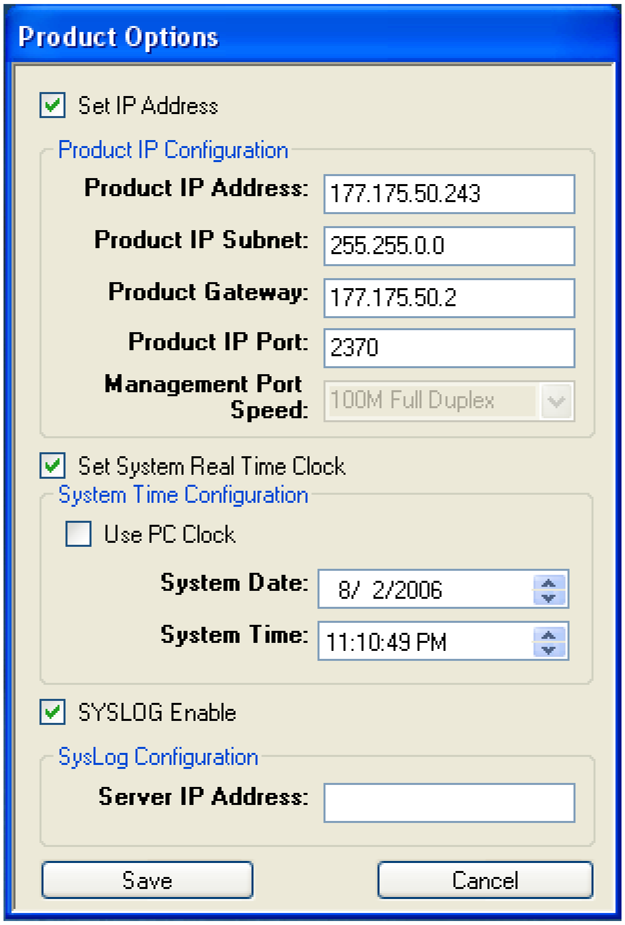


Figure 5.10 Utilities → Upgrade Pull-down Menu

Selecting **Utilities → Upgrade** allows the user to upgrade the operational software files used by the Filtered SINGLE*stream*™. The user may select to upgrade files for the Micro-Processor or for the Filter Engine. These actions should only be taken at the direction of Datacom Systems Technical Support personnel.

Selecting **Utilities → Options** allows the user to change the IP address of the connected Filtered SINGLE*stream*™, direct the Event Log (Syslog) to an external destination, require login access be granted locally from the Filtered SINGLE*stream*™ or from a remote Radius Server, and define the value of the time stamps applie to Event Log entries. The system data and time are based on your PC's date and time. The user can adjust the time stamps if desired (EST vs. GMT etc).

Utilities → Options



Product Options

☑ Set IP Address

Product IP Configuration

Product IP Address: 177.175.50.243

Product IP Subnet: 255.255.0.0

Product Gateway: 177.175.50.2

Product IP Port: 2370

Management Port Speed: 100M Full Duplex

☑ Set System Real Time Clock

System Time Configuration

☐ Use PC Clock

System Date: 8/ 2/2006

System Time: 11:10:49 PM

☑ SYSLOG Enable

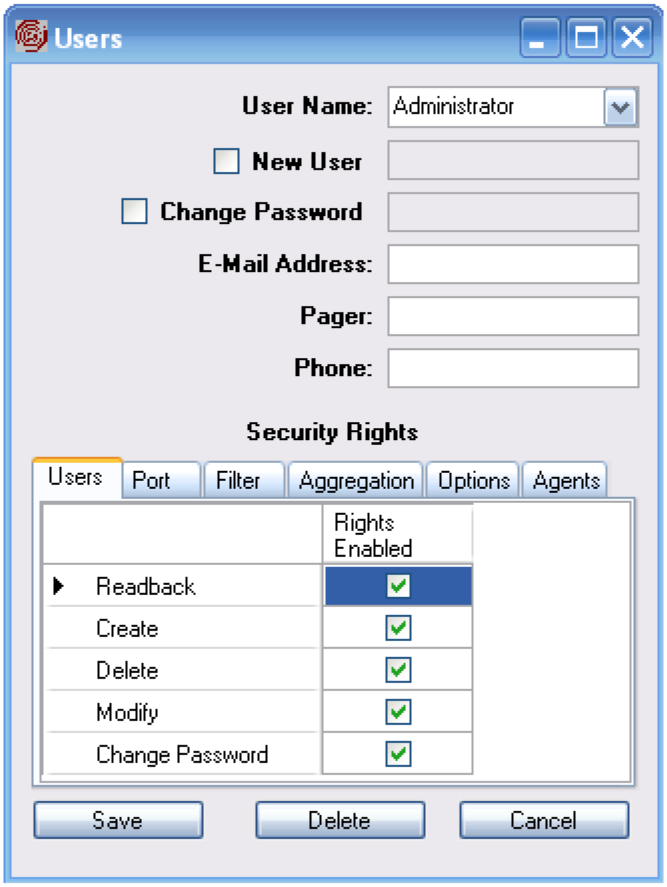
SysLog Configuration

Server IP Address:

Figure 5.11 Utilities → Options Menu

The **Utilities**→ **User Accounts** option allows the user to define new login accounts, modify existing accounts, and add personal contact information to existing accounts. For each account, the Administrator can define access rights. In this manner, the Administrator can limit what configuration options are available to certain login accounts.

Utilities → User Accounts



Users

User Name: Administrator

□ New User

□ Change Password

E-Mail Address:

Pager:

Phone:

Security Rights

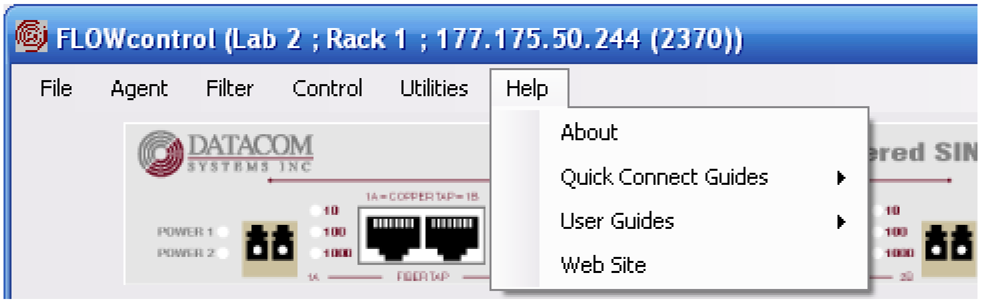
	Rights Enabled
Readback	☑
Create	☑
Delete	☑
Modify	☑
Change Password	☑

Figure 5.12 Utilities → User Accounts Pull-down Menu

5.2.6 Help Pull-down Menu

The **Help** pull-down provides links to information that may assist you while you are using your Filtered SINGLE*stream*™.

Help → {About, Quick Connect Guide, User Guide, Website}



FLOWcontrol (Lab 2 ; Rack 1 ; 177.175.50.244 (2370))

Figure 5.13 Help Pull-down Menu

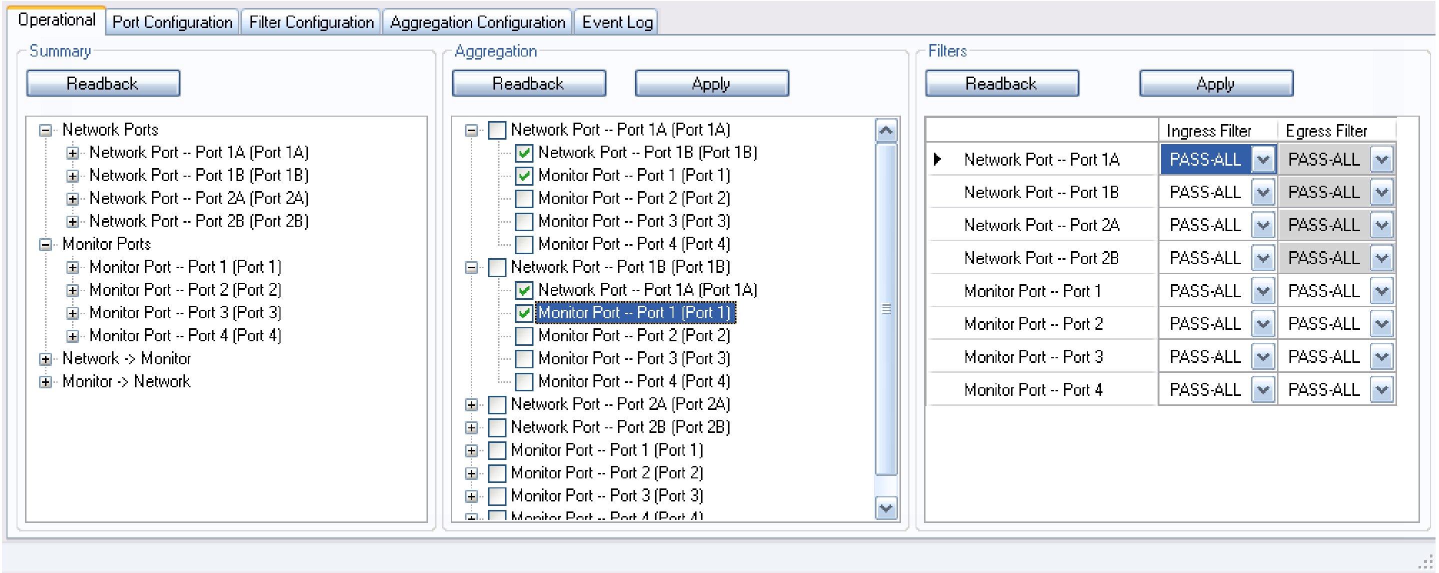
5.3 Configuration Tabs

5.3.1 Operational Tab

From the **Operational Tab**, the user can check the current status of the Network Tap and Monitor Ports available on the connected Filtered SINGLE*stream*™ by clicking the **Readback** button. The user must click **Readback** to view the status of the connected Filtered SINGLE*stream*™. The user can change the configuration by making changes and clicking the **Apply** button. The window is split into three sections: Summary, Aggregation, and Filters.

The Summary section allows the user to visualize the number of Network Tap and Monitor Ports available. Ports on the Filtered SINGLE*stream*™ are not configurable – each port is a part of a Network Tap *or* it is a Monitor Port. Network Taps consist of A and B ports. All FSS models have Network Tap 1 with ports 1A and 1B; FSS-2000 models also have a second Network Tap with ports 2A and 2B. All models have 4 Monitor Ports.

The Aggregation section allows the user to configure the routes that are used by the connected Filtered SINGLE*stream*™. The user can modify the routes by expanding the list of possible routes for a port, then selecting the desired check-boxes. By default, the ports for a single Network Tap are routed to each other (these routes cannot be modified). In the figure below, Ports 1A and 1B make up Network Tap 1. Ports 1, 2, 3, and 4 are the available Monitor Ports. To route full-duplex traffic from Network Tap 1 to Monitor Port 1, expand Port 1A and select Port 1. Then expand Port 1B and select Port 1. Then apply the changes by clicking the **Apply** button. Monitor Port 1 is then going to receive the full-duplex network traffic from Network Tap 1. All full-duplex traffic from Network Tap 1 is then forwarded to Monitor Port 1.



⊟ Network Ports
- ⊞ Network Port -- Port 1A (Port 1A)
- ⊞ Network Port -- Port 1B (Port 1B)
- ⊞ Network Port -- Port 2A (Port 2A)
- ⊞ Network Port -- Port 2B (Port 2B)

⊟ Monitor Ports
- ⊞ Monitor Port -- Port 1 (Port 1)
- ⊞ Monitor Port -- Port 2 (Port 2)
- ⊞ Monitor Port -- Port 3 (Port 3)
- ⊞ Monitor Port -- Port 4 (Port 4)

⊞ Network -> Monitor
⊞ Monitor -> Network

⊟ ☐ Network Port -- Port 1A (Port 1A)
- ☑ Network Port -- Port 1B (Port 1B)
- ☑ Monitor Port -- Port 1 (Port 1)
- ☐ Monitor Port -- Port 2 (Port 2)
- ☐ Monitor Port -- Port 3 (Port 3)
- ☐ Monitor Port -- Port 4 (Port 4)

⊟ ☐ Network Port -- Port 1B (Port 1B)
- ☑ Network Port -- Port 1A (Port 1A)
- ☑ Monitor Port -- Port 1 (Port 1)
- ☐ Monitor Port -- Port 2 (Port 2)
- ☐ Monitor Port -- Port 3 (Port 3)
- ☐ Monitor Port -- Port 4 (Port 4)

⊞ ☐ Network Port -- Port 2A (Port 2A)
⊞ ☐ Network Port -- Port 2B (Port 2B)
⊞ ☐ Monitor Port -- Port 1 (Port 1)
⊞ ☐ Monitor Port -- Port 2 (Port 2)
⊞ ☐ Monitor Port -- Port 3 (Port 3)
⊞ ☐ Monitor Port -- Port 4 (Port 4)

	Ingress Filter	Egress Filter
▶ Network Port -- Port 1A	PASS-ALL	PASS-ALL
Network Port -- Port 1B	PASS-ALL	PASS-ALL
Network Port -- Port 2A	PASS-ALL	PASS-ALL
Network Port -- Port 2B	PASS-ALL	PASS-ALL
Monitor Port -- Port 1	PASS-ALL	PASS-ALL
Monitor Port -- Port 2	PASS-ALL	PASS-ALL
Monitor Port -- Port 3	PASS-ALL	PASS-ALL
Monitor Port -- Port 4	PASS-ALL	PASS-ALL

Figure 5.14 Operational Tab

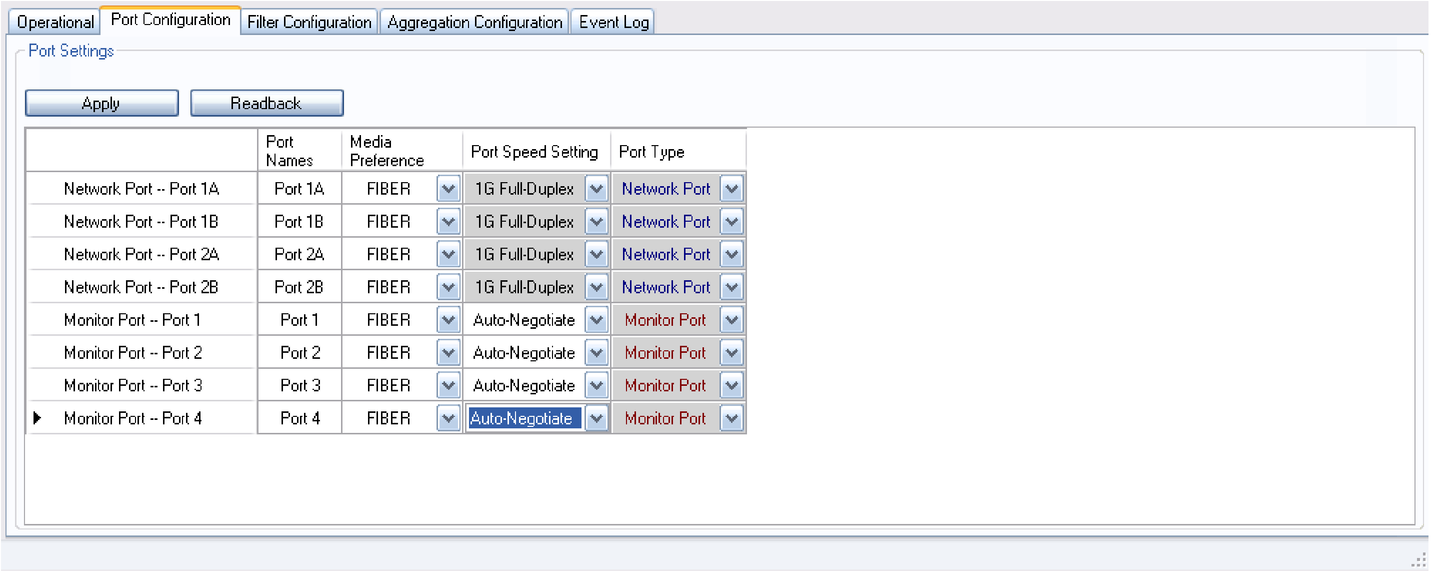
The Filter section allows the user to apply any defined filter to any of the ports of the connected Filtered SINGLE*stream*™. The user can set the filters to PASS-ALL, PASS-NONE,TCP Reset, or any filter defined on the **Filter Configuration** tab.

5.3.2 Port Configuration Tab

The **Port Configuration** tab allows the user to view or modify the port settings for all the available ports of the connected Filtered SINGLE*stream*™. The Port Name, Media, and Port Speed can all be selected by the user. FSS-2000BT/LX and FSS-2000BT/SX models have both fiber and copper media available for all ports, including the Network Tap ports. Other models only have both fiber and copper media available for the Monitor Ports. In each case, **Copper** is the default media type. To use a fiber connection for a port that allows for both media types, you must access the Port Configuration and modify the Media Preference to **Fiber**. The Port Type cannot be modified, as it is dependent upon which model of Filtered SINGLE*stream*™ you are connected to.

TIP Be sure that the correct speed setting is used consistently across Network Taps. Both the A and B ports of any Network Tap must have the same speed setting! Also be sure to only send an appropriate amount of traffic to any connected monitoring device. A 10BaseT network analyzer cannot handle all (unfiltered) traffic from both sides of a full-duplex 100BaseT Network Tap. If you direct more traffic to a device than its link can handle, your monitored traffic will suffer from randomized packet loss.

The **Readback** button allows the user to view the current settings of the connected Filtered SINGLE*stream*™, while the **Apply** button allows the user to send new configurations to the connected Filtered SINGLE*stream*™.



	Port Names	Media Preference	Port Speed Setting	Port Type
Network Port -- Port 1A	Port 1A	FIBER	1G Full-Duplex	Network Port
Network Port -- Port 1B	Port 1B	FIBER	1G Full-Duplex	Network Port
Network Port -- Port 2A	Port 2A	FIBER	1G Full-Duplex	Network Port
Network Port -- Port 2B	Port 2B	FIBER	1G Full-Duplex	Network Port
Monitor Port -- Port 1	Port 1	FIBER	Auto-Negotiate	Monitor Port
Monitor Port -- Port 2	Port 2	FIBER	Auto-Negotiate	Monitor Port
Monitor Port -- Port 3	Port 3	FIBER	Auto-Negotiate	Monitor Port
▶ Monitor Port -- Port 4	Port 4	FIBER	Auto-Negotiate	Monitor Port

Figure 5.15 Port Configuration Tab

5.3.3 Filter Configuration Tab

The **Filter Configuration** tab provides the user with many filtering options. The screen is split into two sections. On the left side, **Saved Filters**, **Basic**, and **Advanced** tabs are available. Each allows the user to configure specific kinds of filters. On the right side, the **Filter Functions** section provides a tabular representation of the filters applied to each port as ingress and/or egress filters.

The **Saved Filters** tab allows the user to select a filter that has been defined previously. Any saved filter can be selected, and then applied to one of the ports of the connected Filtered SINGLE*stream*™.

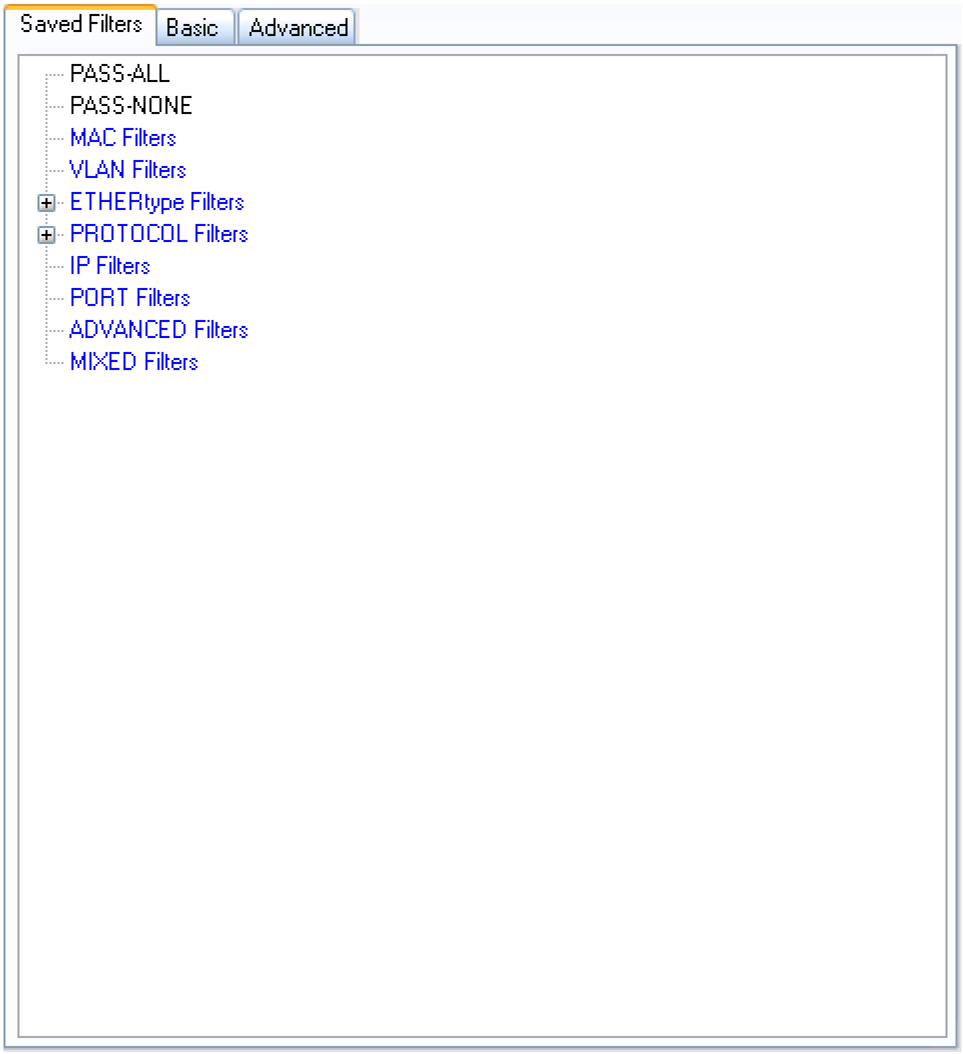
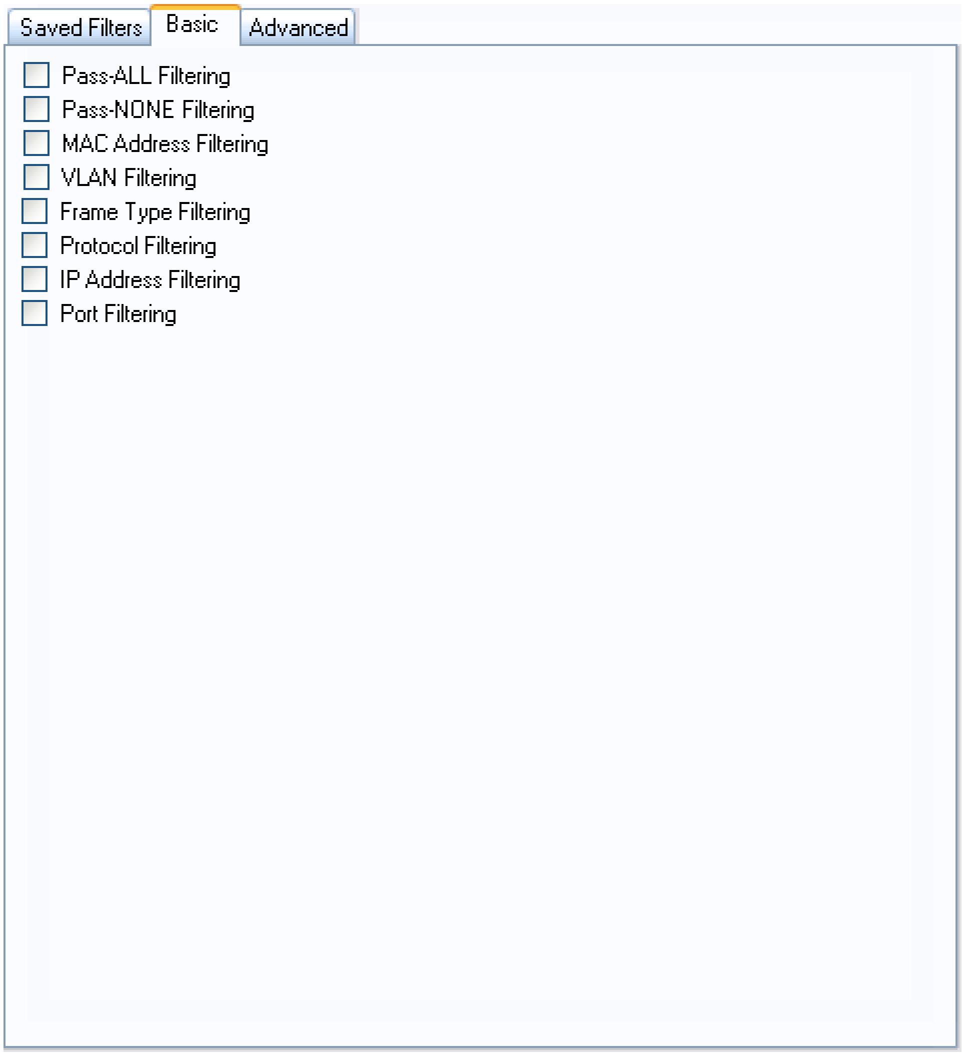


Figure 5.16 Filter Configuration Tab → Saved Filters

The **Basic** tab, provides the user with many filtering options that may be used on a regular basis. These filters include the Pass-ALL and Pass-NONE options. These first two options completely enable or completely disable traffic flow to a particular port. The other options require some configuration; selecting one of these options results in a new set of options being displayed for the user.



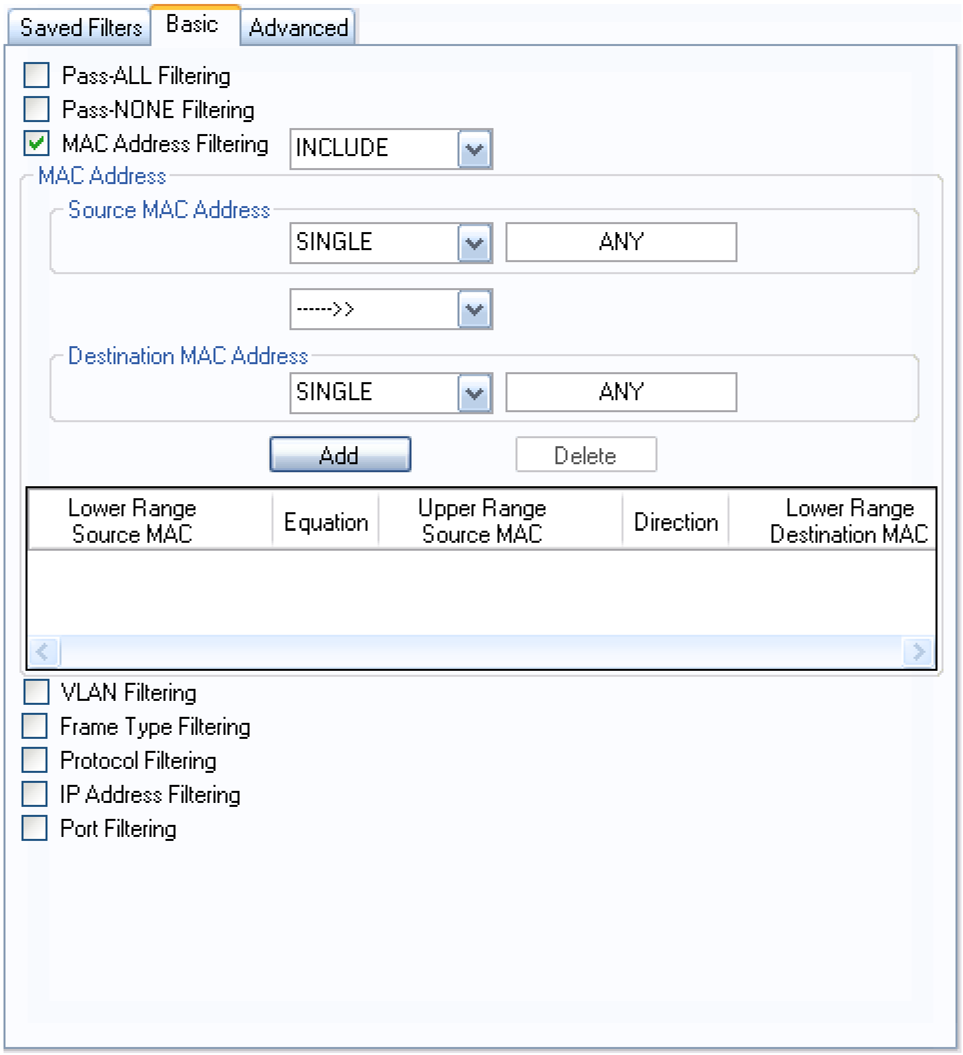
☐ Pass-ALL Filtering
☐ Pass-NONE Filtering
☐ MAC Address Filtering
☐ VLAN Filtering
☐ Frame Type Filtering
☐ Protocol Filtering
☐ IP Address Filtering
☐ Port Filtering

Figure 5.17 Filter Configuration Tab → Basic

The third Basic Filter option is **MAC Address Filtering**. Selecting this box allows the user to create a configurable filter based on the Media Access Control (MAC) Addresses of the networked computers.

TIP The MAC Address is a unique 48-bit unique address permanently assigned to each network interface card; it is typically written as 12 hexadecimal digits.

A filter can be defined to Include the traffic that meets the requirements of the filter, or the filter can be defined to Exclude the traffic that meets the requirements of the filter. A filter can be defined for a single MAC address or for a range of MAC addresses. The Source Address (the sending machine) and the Destination Address (the intended recipient) can be configured separately. Selecting a Single address of Any applies the filter to all detected traffic. After creating an Include/Exclude- Source-Destination rule, the user can Add the rule. Multiple rules can be created and added. The Arrow selection box allows the user to quickly change a defined rule. By default, the arrow points to the right, which filters for packets from the Source Address to the Destination Address. By selecting the left-pointing arrow, the user can quickly filter for packets sent from the Destination Address to the Source Address. Lastly, by selecting the arrows pointing in both directions, the user can create a rule that looks for any packet exchanged between the two sets of Addresses – regardless of which is the source and which is the destination.



☐ Pass-ALL Filtering
☐ Pass-NONE Filtering
☑ MAC Address Filtering INCLUDE

MAC Address

Source MAC Address: SINGLE ANY

------>>

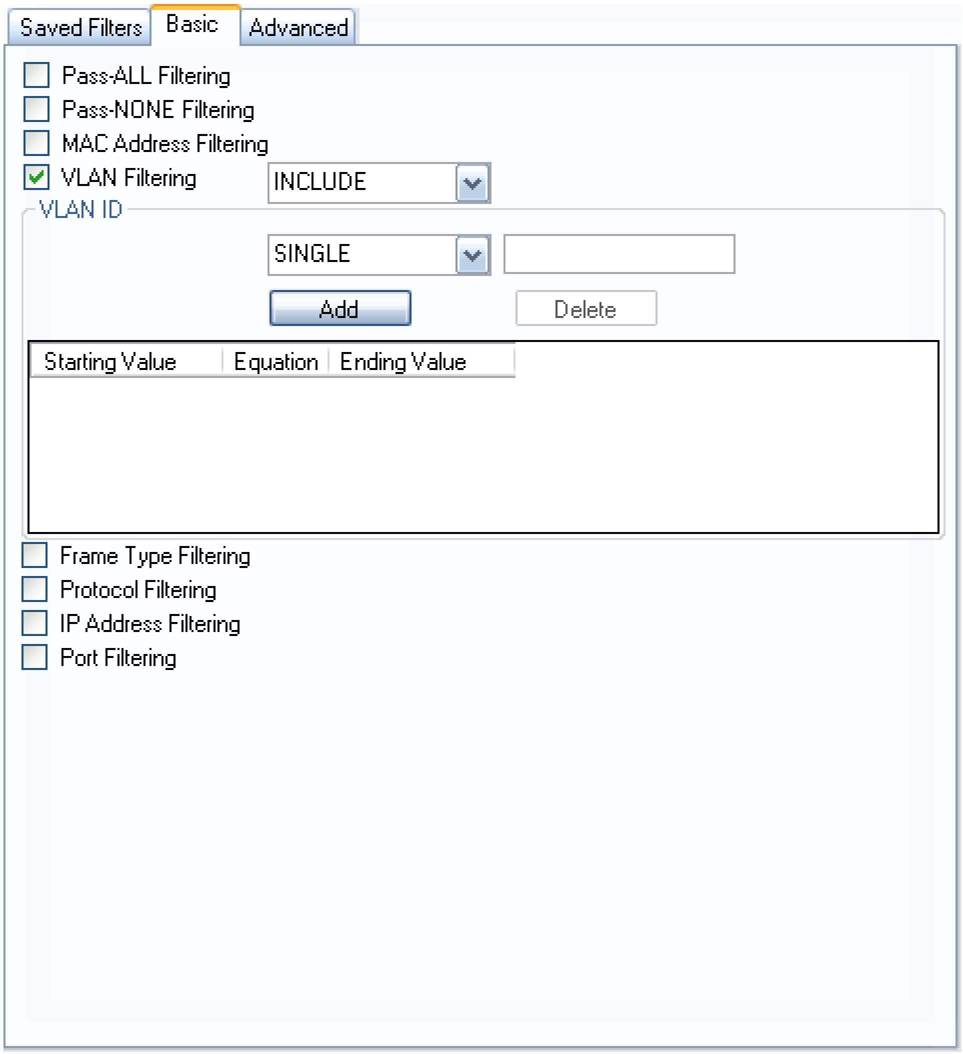
Destination MAC Address: SINGLE ANY

Lower Range Source MAC	Equation	Upper Range Source MAC	Direction	Lower Range Destination MAC

☐ VLAN Filtering
☐ Frame Type Filtering
☐ Protocol Filtering
☐ IP Address Filtering
☐ Port Filtering

Figure 5.18 Filter Configuration Tab → Basic → MAC Address Filtering

The fourth Basic Filter option is **VLAN Filtering**. Using this option, the user can create configurable filters that include or exclude traffic based on the VLAN ID assigned to the Source of the network traffic. Rules can be created for single IDs or for a range of IDs. Multiple rules can be created and applied as a single filter.



☐ Pass-ALL Filtering

☐ Pass-NONE Filtering

☐ MAC Address Filtering

☑ VLAN Filtering: INCLUDE

VLAN ID: SINGLE

Starting Value	Equation	Ending Value

☐ Frame Type Filtering

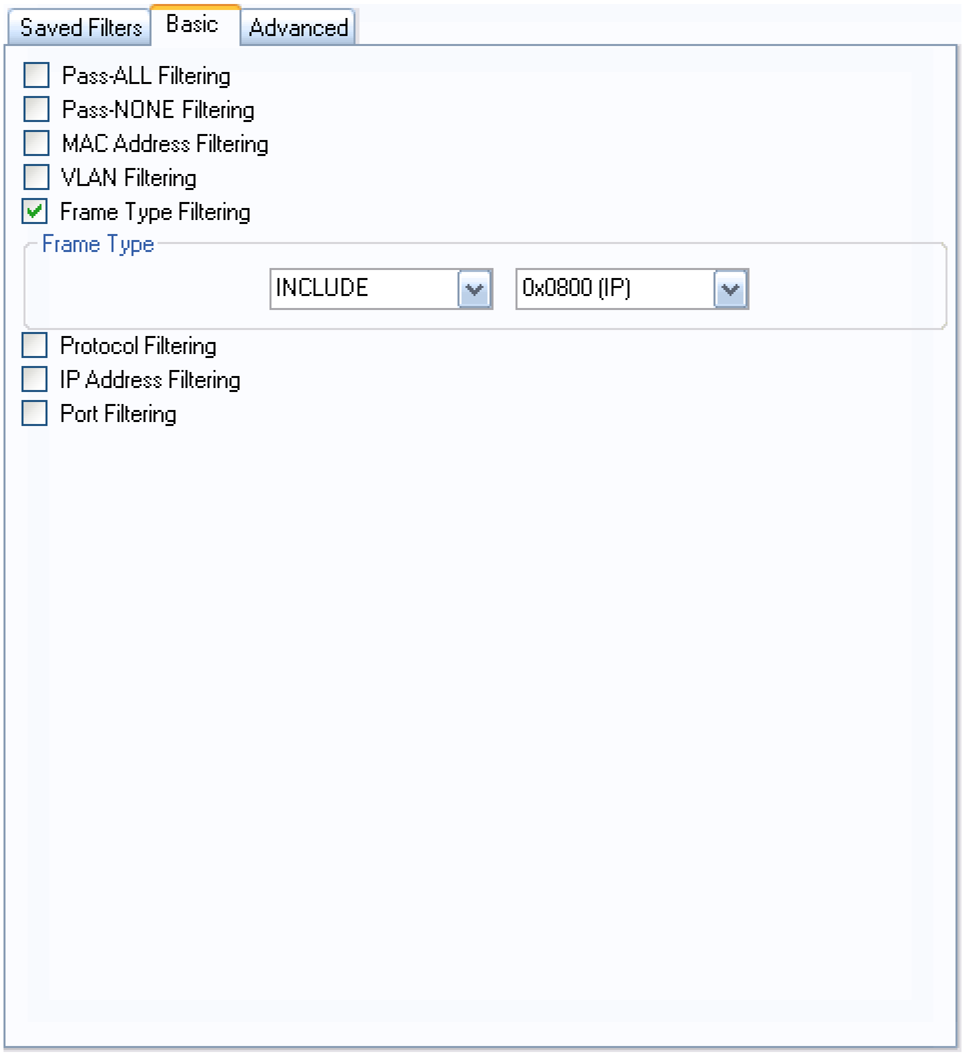
☐ Protocol Filtering

☐ IP Address Filtering

☐ Port Filtering

Figure 5.19 Filter Configuration Tab → Basic → VLAN Filtering

The fifth Basic Filter option is **Frame Type Filtering.** This option allows the user to create configurable filters to include or exclude specific types of frames. The available frame types include 0x0800 (IP) and 0x8137 (IPX). Using these options, the user can include or exclude IP or IPX traffic if desired.



□ Pass-ALL Filtering
□ Pass-NONE Filtering
□ MAC Address Filtering
□ VLAN Filtering
☑ Frame Type Filtering

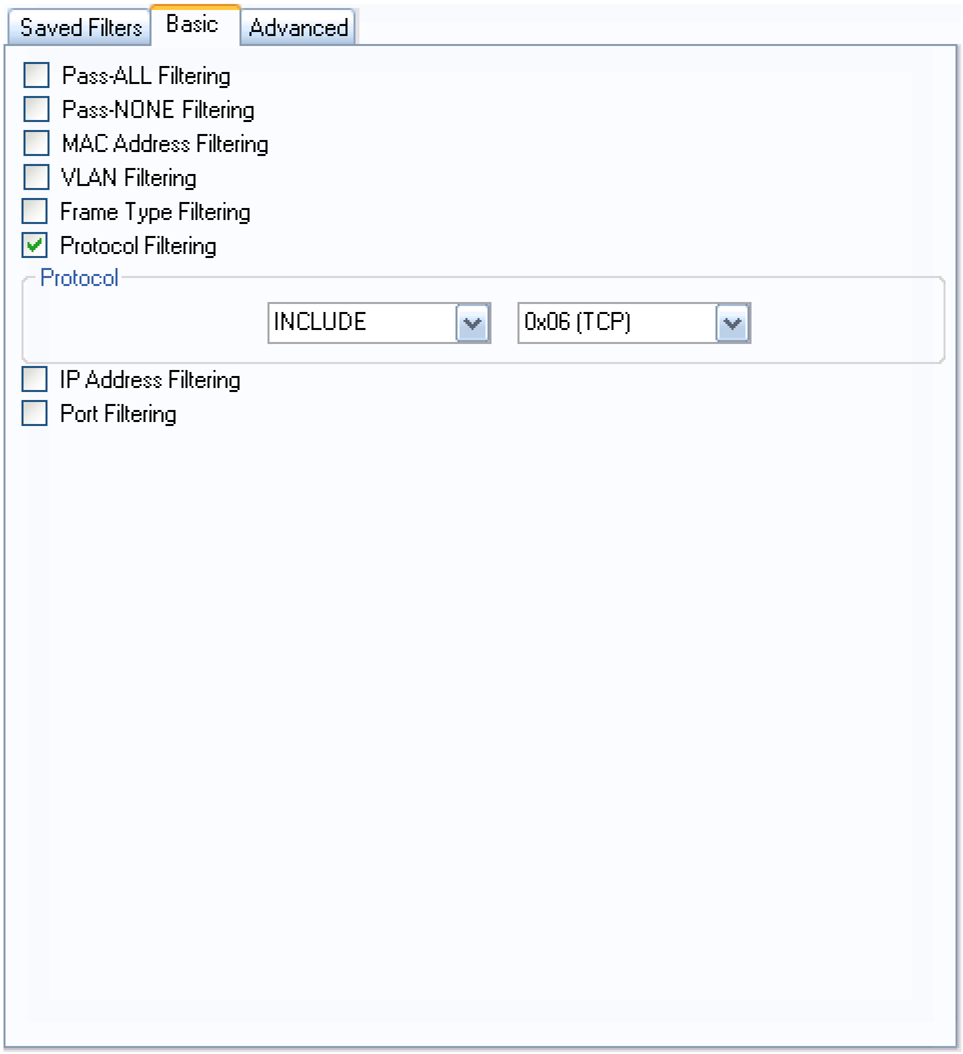
Frame Type

INCLUDE 0x0800 (IP)

□ Protocol Filtering
□ IP Address Filtering
□ Port Filtering

Figure 5.20 Filter Configuration Tab → Basic → Frame Type Filtering

The sixth Basic Filtering option is **Protocol Filtering.** This option allows the user to create configurable filters to include or exclude specific network protocols. The network protocols available for filtering include TCP and UDP.



□ Pass-ALL Filtering
□ Pass-NONE Filtering
□ MAC Address Filtering
□ VLAN Filtering
□ Frame Type Filtering
☑ Protocol Filtering

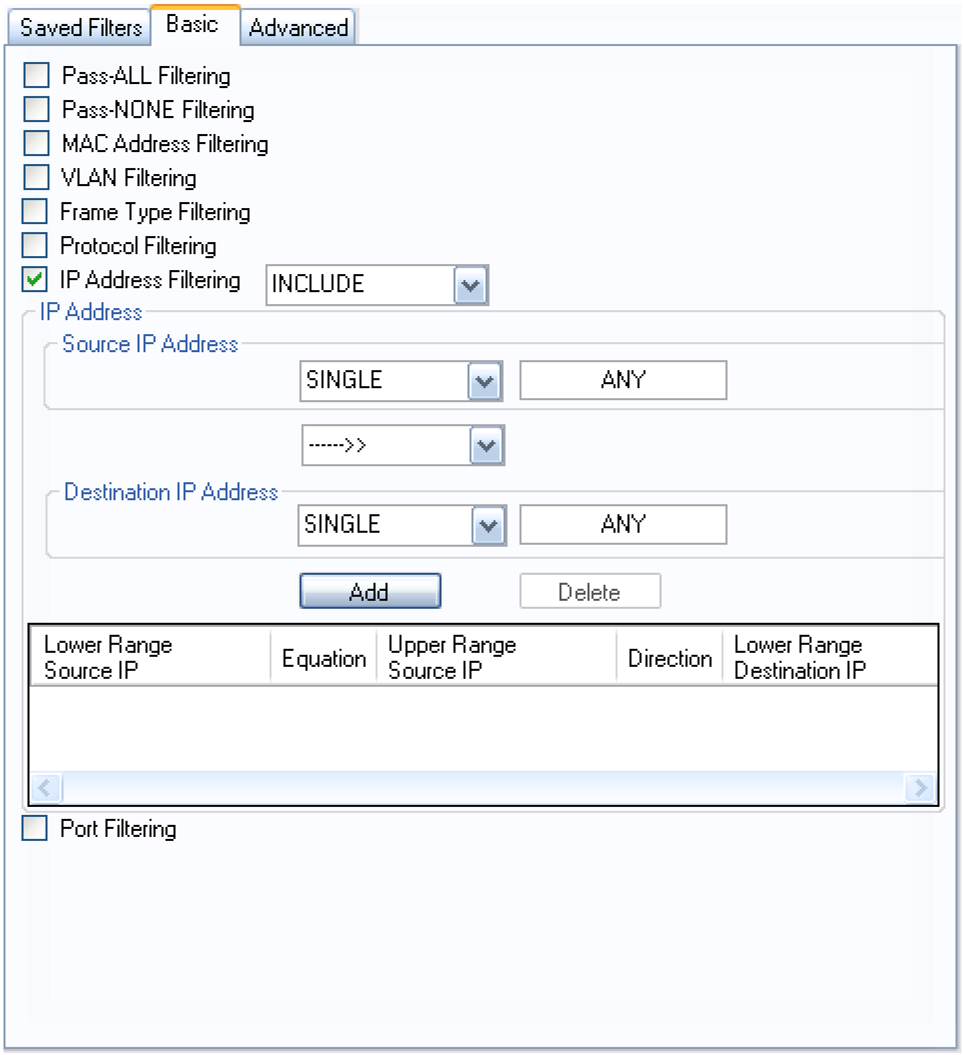
Protocol

INCLUDE ▾ 0x06 (TCP) ▾

□ IP Address Filtering
□ Port Filtering

Figure 5.21 Filter Configuration Tab → Basic → Protocol Filtering

The seventh Basic Filtering option is **IP Address Filtering.** This option allows the user to create configurable filters that include or exclude traffic based on the source and destination IP addresses. The configuration of this filter is similar to that of the MAC Address Filtering. The user can create multiple rules; each rule can include the traffic that meets the filter requirements, or exclude the traffic that meets the filter requirements. The Source and Destination addresses can be a single IP address, or a range of IP addresses. The Arrow selection box allows the user to quickly change a defined rule. By default, the arrow points to the right, which filters for packets from the Source Address to the Destination Address. By selecting the left-pointing arrow, the user can quickly filter for packets sent from the Destination Address to the Source Address. Lastly, by selecting the arrows pointing in both directions, the user can create a rule that looks for any packet exchanged between the two sets of Addresses – regardless of which is the source and which is the destination.



□ Pass-ALL Filtering
□ Pass-NONE Filtering
□ MAC Address Filtering
□ VLAN Filtering
□ Frame Type Filtering
□ Protocol Filtering
☑ IP Address Filtering INCLUDE

IP Address

Source IP Address: SINGLE ANY

------>>

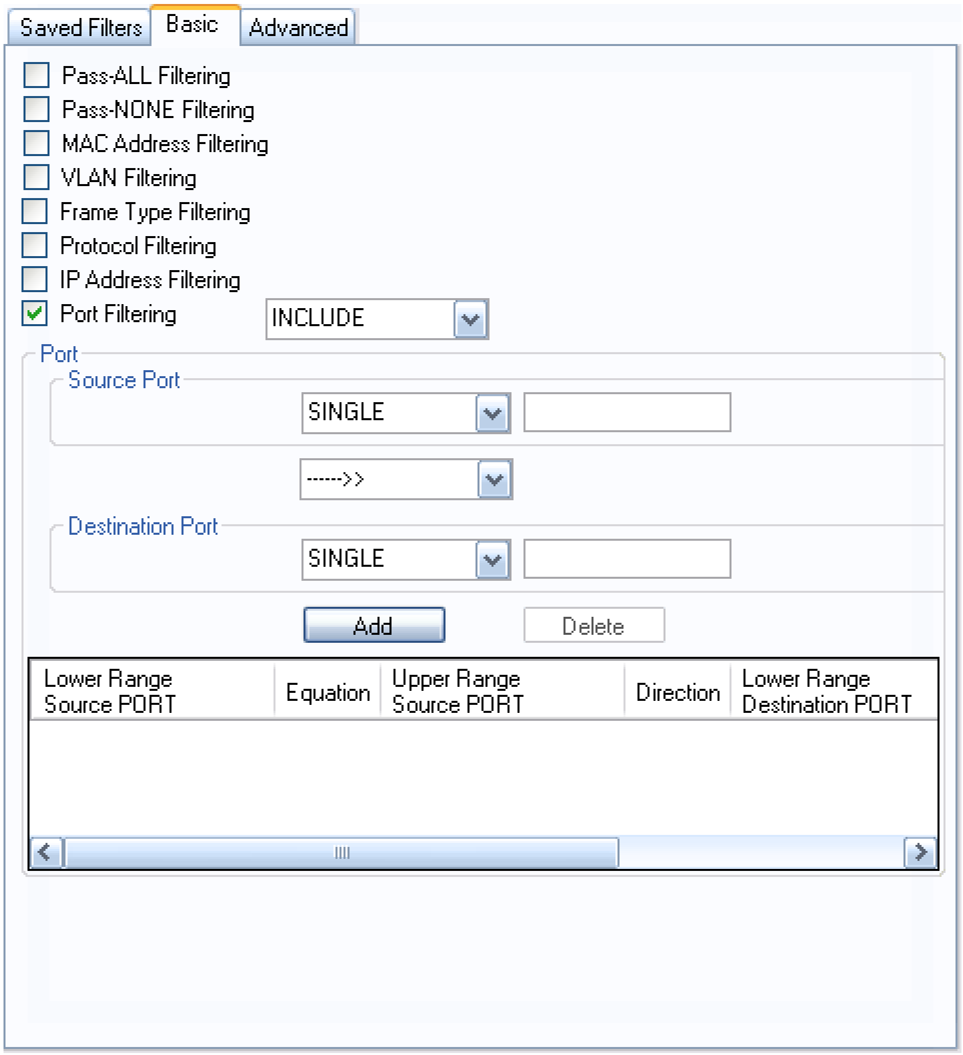
Destination IP Address: SINGLE ANY

Lower Range Source IP	Equation	Upper Range Source IP	Direction	Lower Range Destination IP

□ Port Filtering

Figure 5.22 Filter Configuration Tab → Basic → IP Address Filtering

The eighth and final Basic Filtering option is **Port Filtering**. With this option, the user can create configurable filters that include or exclude traffic based on the Source and Destination Ports. The user can create multiple rules. Each rule can include the traffic that meets the filter requirements, or exclude the traffic that meets the filter requirements. The Source and Destination can include a single port number or a range of port numbers. The Arrow selection box allows the user to quickly change a defined rule. By default, the arrow points to the right, which filters for packets from the Source Address to the Destination Address. By selecting the left-pointing arrow, the user can quickly filter for packets sent from the Destination Address to the Source Address. Lastly, by selecting the arrows pointing in both directions, the user can create a rule that looks for any packet exchanged between the two sets of Addresses – regardless of which is the source and which is the destination.



□ Pass-ALL Filtering
□ Pass-NONE Filtering
□ MAC Address Filtering
□ VLAN Filtering
□ Frame Type Filtering
□ Protocol Filtering
□ IP Address Filtering
☑ Port Filtering INCLUDE

Port

Source Port: SINGLE

------>>

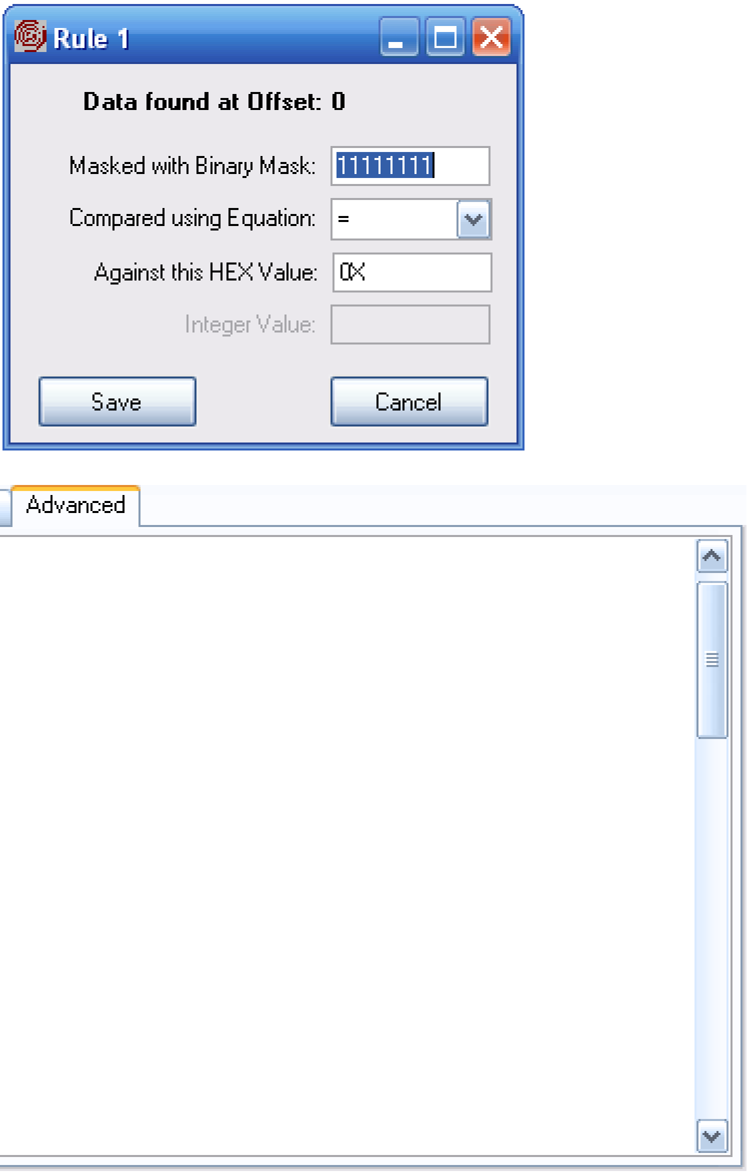
Destination Port: SINGLE

Lower Range Source PORT	Equation	Upper Range Source PORT	Direction	Lower Range Destination PORT

Figure 5.23 Filter Configuration Tab → Basic → Port Filtering

The **Advanced** filter tab should only be used to create very specific filters. The Advanced tab provides the user with the ability to filter network traffic based on the bit masks of the individual frames. Within any frame, the user can add a rule for the value of any byte within the frame. The rules must be defined at offsets of whole words. Rule 1 and Rule 2 both allow for data filters for the bytes at offsets of 0 through 63. In the figure below, a filter has been added that requires the fifth byte of data (offset by 4 bytes) must represent a value of 0x1A or less. To add such a rule, select the desired byte, right click, and then select **Add.** The Binary Mask can be used to limit the filter to consider only a portion of the selected byte. A "1" in the Binary Mask includes that bit against the filter value, while a "0" excludes that bit from consideration. For example, a Binary Mask of "00001111" would result in the last four bits of the selected byte being compared to the value of 0x1A. A single filter can be defined for each byte. Before creating an Advanced filter, be sure you understand the structure of the data frames that you would like to filter.

TIP For a closer look at the structure of some standard frames, turn to Appendix A.



Data found at Offset: 0

Masked with Binary Mask: 11111111

Compared using Equation: =

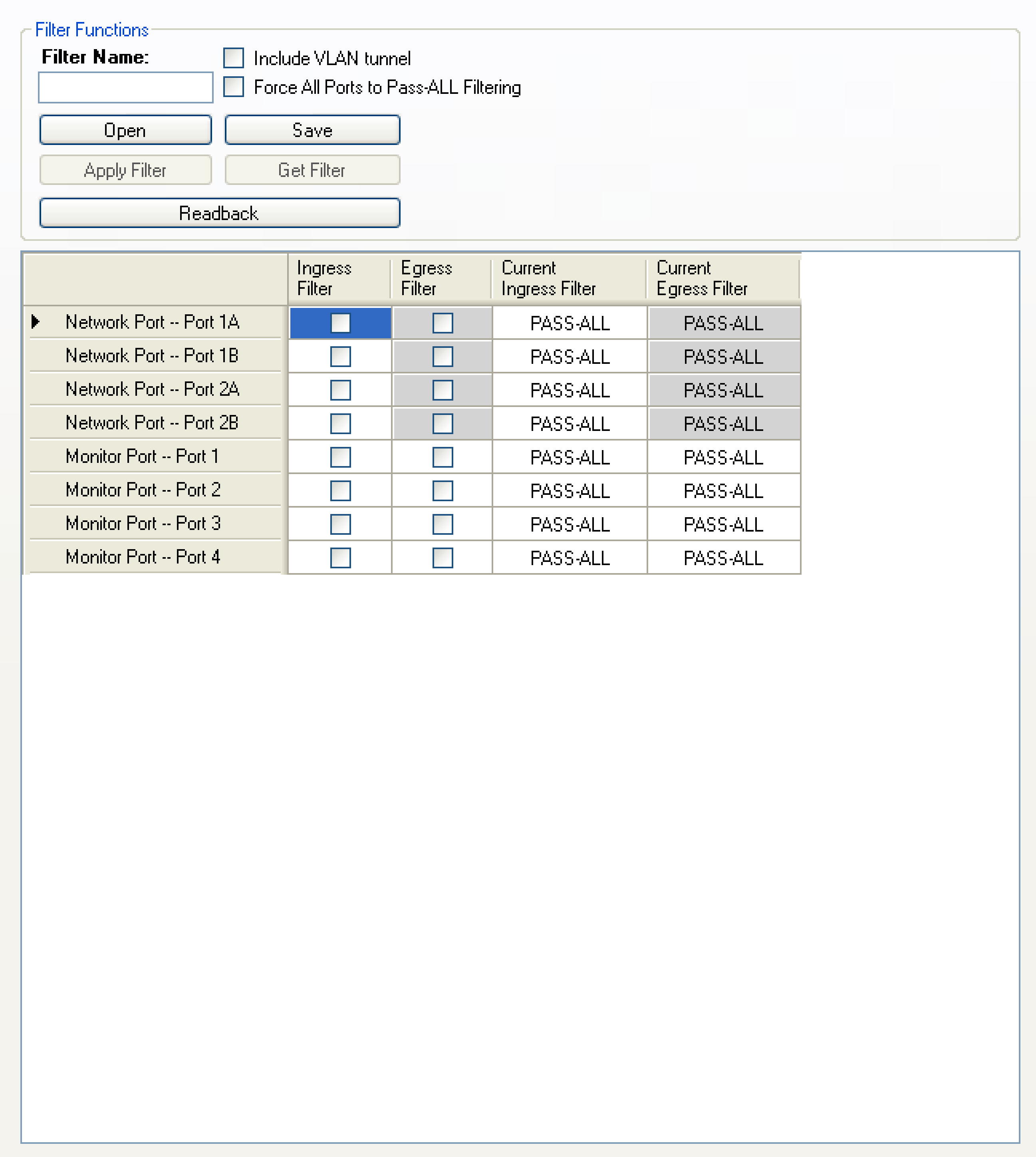
Against this HEX Value: 0X

Integer Value:

Rule 2
- Offset 0
- Offset 1
- Offset 2
- Offset 3
- Offset 4
- Offset 5
- Offset 6
- Offset 7
- Offset 8
- Offset 9
- Offset 10
- Offset 11
- Offset 12
- Offset 13
- Offset 14
- Offset 15
- Offset 16
- Offset 17

Figure 5.24 Creating a Rule Using the Filter Configuration Tab → MAC Address Filtering

On the right side of the **Filter Configuration** tab is the **Filter Functions** section. This section allows the user to apply a Saved, Basic, or Advanced filter defined on the left side of the window to any appropriate port. Network Tap ports can only have Ingress Filters applied, whereas Monitor Ports can have Ingress and/or Egress Filters applied.



Filter Functions

Filter Name:

□ Include VLAN tunnel

□ Force All Ports to Pass-ALL Filtering

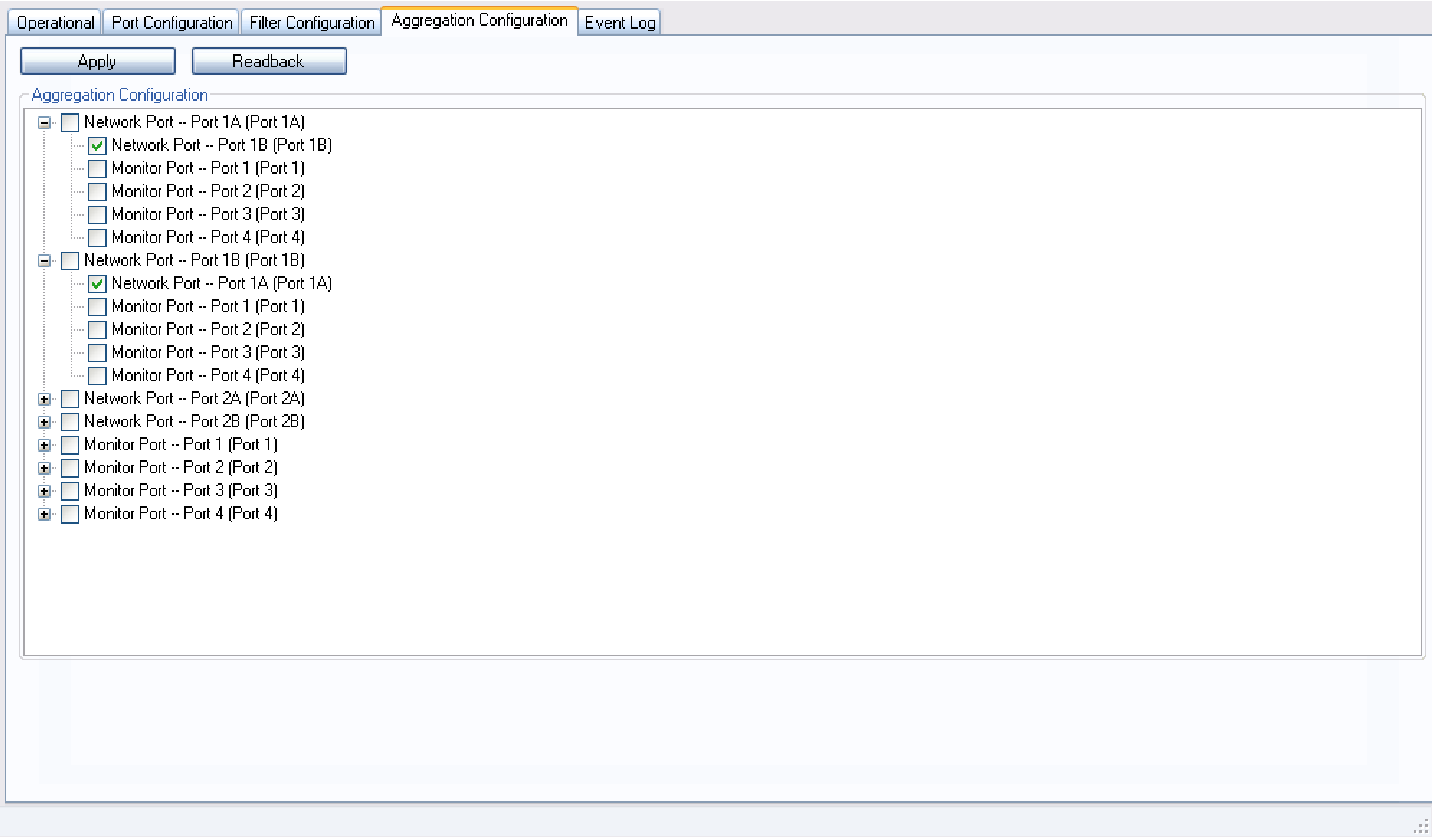
	Ingress Filter	Egress Filter	Current Ingress Filter	Current Egress Filter
▶ Network Port -- Port 1A	□	□	PASS-ALL	PASS-ALL
Network Port -- Port 1B	□	□	PASS-ALL	PASS-ALL
Network Port -- Port 2A	□	□	PASS-ALL	PASS-ALL
Network Port -- Port 2B	□	□	PASS-ALL	PASS-ALL
Monitor Port -- Port 1	□	□	PASS-ALL	PASS-ALL
Monitor Port -- Port 2	□	□	PASS-ALL	PASS-ALL
Monitor Port -- Port 3	□	□	PASS-ALL	PASS-ALL
Monitor Port -- Port 4	□	□	PASS-ALL	PASS-ALL

Figure 5.25 Filter Functions Window

5.3.4 Aggregation Configuration Tab

The **Aggregation Configuration** tab allows the user to modify the routes used by the Filtered SINGLE*stream*™. By default, the A and B ports of any Network Tap are routed to each other. This setting cannot be changed, or else the Network Tap would cause a break in the network. The Filter Product Console software does not allow the user to make this change. The **Readback** button allows the user to view the current Aggregation Configuration. After making changes, the user must click the **Apply** button for the changes to take affect.

The user can also create routes from any Network Tap port to any Monitor Port. Traffic from a Network Tap port can be routed to multiple Monitor Ports if desired. Additionally, traffic from multiple Network Tap ports can be routed to a single Monitor Port if desired. When connected to an FSS-2000 series model, all four Network Tap ports (1A, 1B, 2A, and 2B) could be routed to a single Monitor Port if desired. When routing Network Tap ports to Monitor Ports, be aware of the connection speed limitations of the devices connected to the Monitor Port. If four 1000BaseT Network Tap ports are routed to a single 100BaseT monitoring device, you may experience random packet loss. Random packet loss may lead to inconsistent network monitoring results.

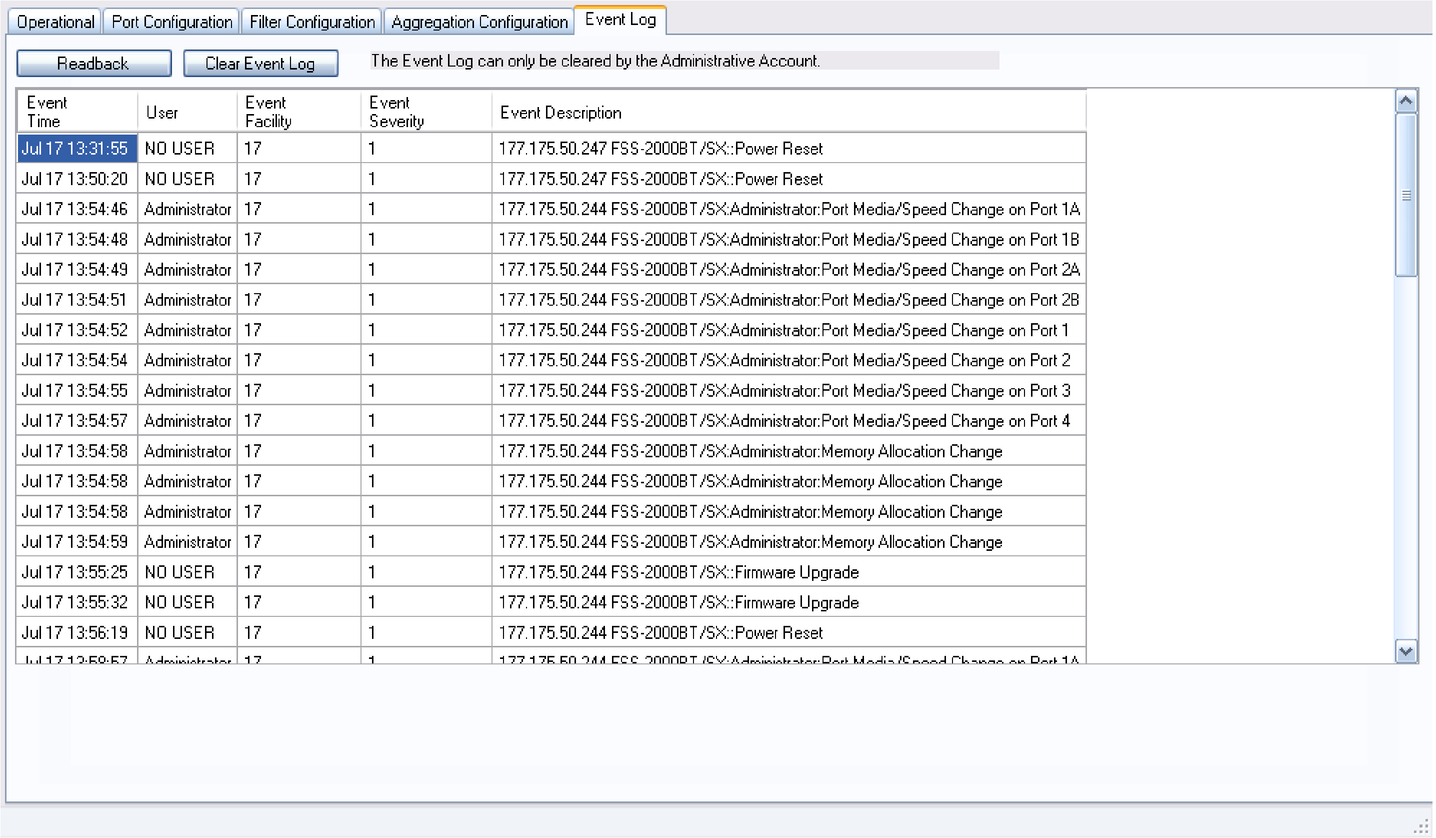


- □ Network Port -- Port 1A (Port 1A)
  - ☑ Network Port -- Port 1B (Port 1B)
  - □ Monitor Port -- Port 1 (Port 1)
  - □ Monitor Port -- Port 2 (Port 2)
  - □ Monitor Port -- Port 3 (Port 3)
  - □ Monitor Port -- Port 4 (Port 4)
- □ Network Port -- Port 1B (Port 1B)
  - ☑ Network Port -- Port 1A (Port 1A)
  - □ Monitor Port -- Port 1 (Port 1)
  - □ Monitor Port -- Port 2 (Port 2)
  - □ Monitor Port -- Port 3 (Port 3)
  - □ Monitor Port -- Port 4 (Port 4)
- □ Network Port -- Port 2A (Port 2A)
- □ Network Port -- Port 2B (Port 2B)
- □ Monitor Port -- Port 1 (Port 1)
- □ Monitor Port -- Port 2 (Port 2)
- □ Monitor Port -- Port 3 (Port 3)
- □ Monitor Port -- Port 4 (Port 4)

Figure 5.26 Aggregation Configuration Tab

5.3.5 Event Log Tab

The Event Log Tab allows the user to quickly monitor any actions or events that have occurred with the connected Filtered SINGLE*stream*™. Each entry in the Event Log captures the time of the event, the user who made the change, the IP address of the Filtered SINGLE*stream*™, and a brief description of the event itself. This information allows the user to track any changes that may have been made to the connected Filtered SINGLE*stream*™. The Event Log will also alert the user to any operating errors that may have been encountered during the normal operation of the Filtered SINGLE*stream*™.



The Event Log can only be cleared by the Administrative Account.

Event Time	User	Event Facility	Event Severity	Event Description
Jul 17 13:31:55	NO USER	17	1	177.175.50.247 FSS-2000BT/SX::Power Reset
Jul 17 13:50:20	NO USER	17	1	177.175.50.247 FSS-2000BT/SX::Power Reset
Jul 17 13:54:46	Administrator	17	1	177.175.50.244 FSS-2000BT/SX:Administrator:Port Media/Speed Change on Port 1A
Jul 17 13:54:48	Administrator	17	1	177.175.50.244 FSS-2000BT/SX:Administrator:Port Media/Speed Change on Port 1B
Jul 17 13:54:49	Administrator	17	1	177.175.50.244 FSS-2000BT/SX:Administrator:Port Media/Speed Change on Port 2A
Jul 17 13:54:51	Administrator	17	1	177.175.50.244 FSS-2000BT/SX:Administrator:Port Media/Speed Change on Port 2B
Jul 17 13:54:52	Administrator	17	1	177.175.50.244 FSS-2000BT/SX:Administrator:Port Media/Speed Change on Port 1
Jul 17 13:54:54	Administrator	17	1	177.175.50.244 FSS-2000BT/SX:Administrator:Port Media/Speed Change on Port 2
Jul 17 13:54:55	Administrator	17	1	177.175.50.244 FSS-2000BT/SX:Administrator:Port Media/Speed Change on Port 3
Jul 17 13:54:57	Administrator	17	1	177.175.50.244 FSS-2000BT/SX:Administrator:Port Media/Speed Change on Port 4
Jul 17 13:54:58	Administrator	17	1	177.175.50.244 FSS-2000BT/SX:Administrator:Memory Allocation Change
Jul 17 13:54:58	Administrator	17	1	177.175.50.244 FSS-2000BT/SX:Administrator:Memory Allocation Change
Jul 17 13:54:58	Administrator	17	1	177.175.50.244 FSS-2000BT/SX:Administrator:Memory Allocation Change
Jul 17 13:54:59	Administrator	17	1	177.175.50.244 FSS-2000BT/SX:Administrator:Memory Allocation Change
Jul 17 13:55:25	NO USER	17	1	177.175.50.244 FSS-2000BT/SX::Firmware Upgrade
Jul 17 13:55:32	NO USER	17	1	177.175.50.244 FSS-2000BT/SX::Firmware Upgrade
Jul 17 13:56:19	NO USER	17	1	177.175.50.244 FSS-2000BT/SX::Power Reset
Jul 17 13:58:57	Administrator	17	1	177.175.50.244 FSS-2000BT/SX:Administrator:Port Media/Speed Change on Port 1A

Figure 5.27 Event Log Tab

5.4 Example Use of Filter Product Console - Printer Traffic

As an example, the following steps outline how to create a Network Tap, create a filter that passes only traffic being sent to a known destination, and route the filtered traffic to a connected monitoring device. In this example, we are interested in monitoring the network traffic being sent to a network printer. The printer has a fixed IP address of 10.10.5.5.

This section outlines the procedure to configure a hypothetical Network Tap. This information is presented only to offer an example of how you *could* create a useful Network Tap. This exact procedure may not apply to your network.

The example network is a 100BaseT network, and we will use an FSS-2000BT Filtered SINGLE*stream*™. The first thing we need to do is physically create the Network Tap. The network printer is originally connected to a 100BaseT LAN switch. Disconnect the printer from the LAN Switch, and create the Network Tap as shown in the figure below.

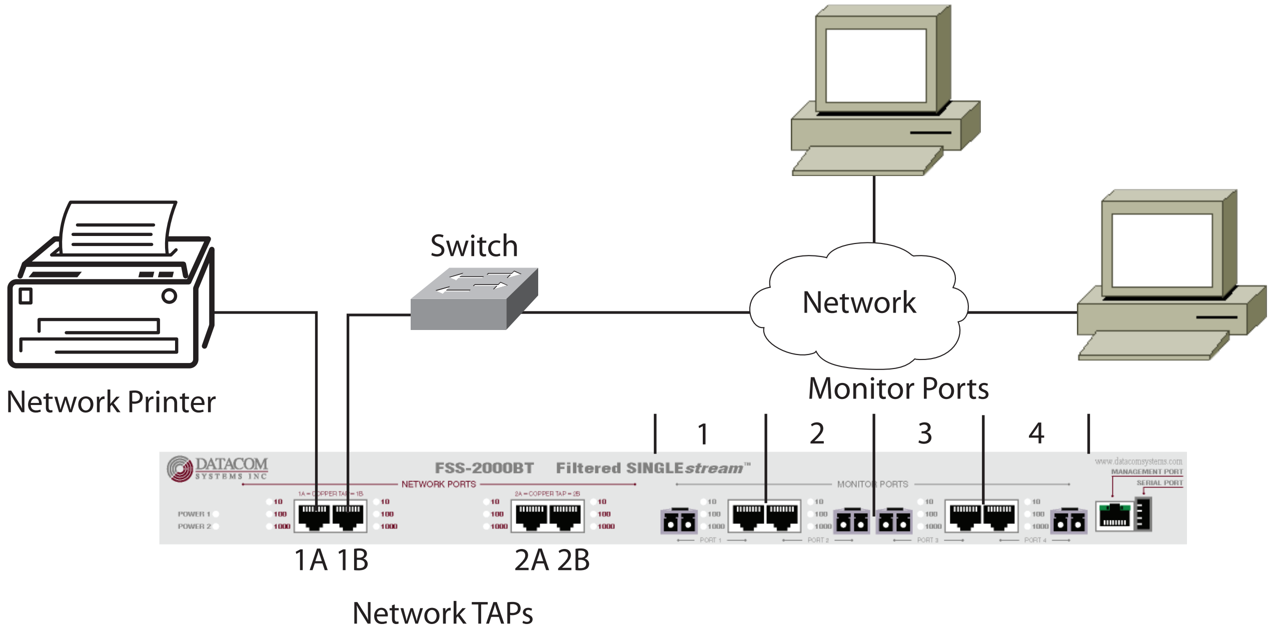


Figure 5.28 FSS-2000BT Network Printer Application

Once the Network Tap has been created, the Network PCs can access the printer just like normal. The Network Tap is passive and will not disrupt the network in any way. Next, connect the monitoring device, a 10BaseT half-duplex LAN Analyzer in this case, to Monitor Port 1. Once all the physical connections have been made and verified, you are ready to create the route and apply the filter.

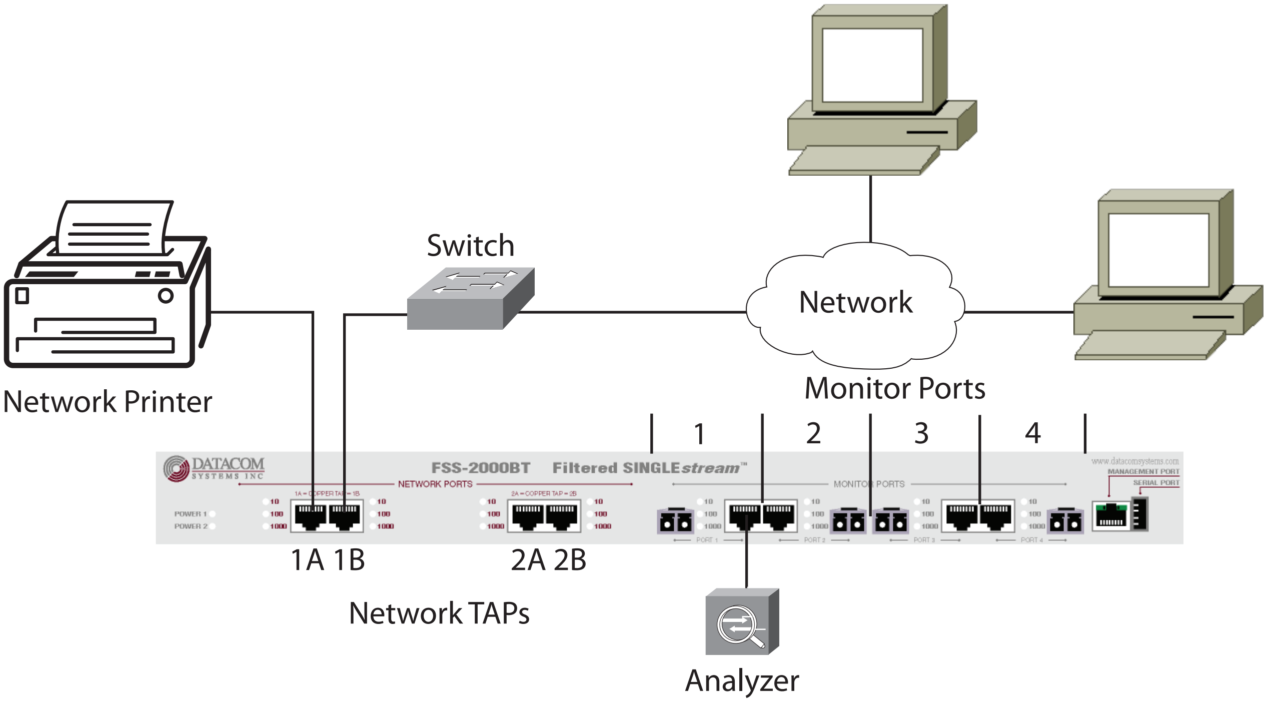
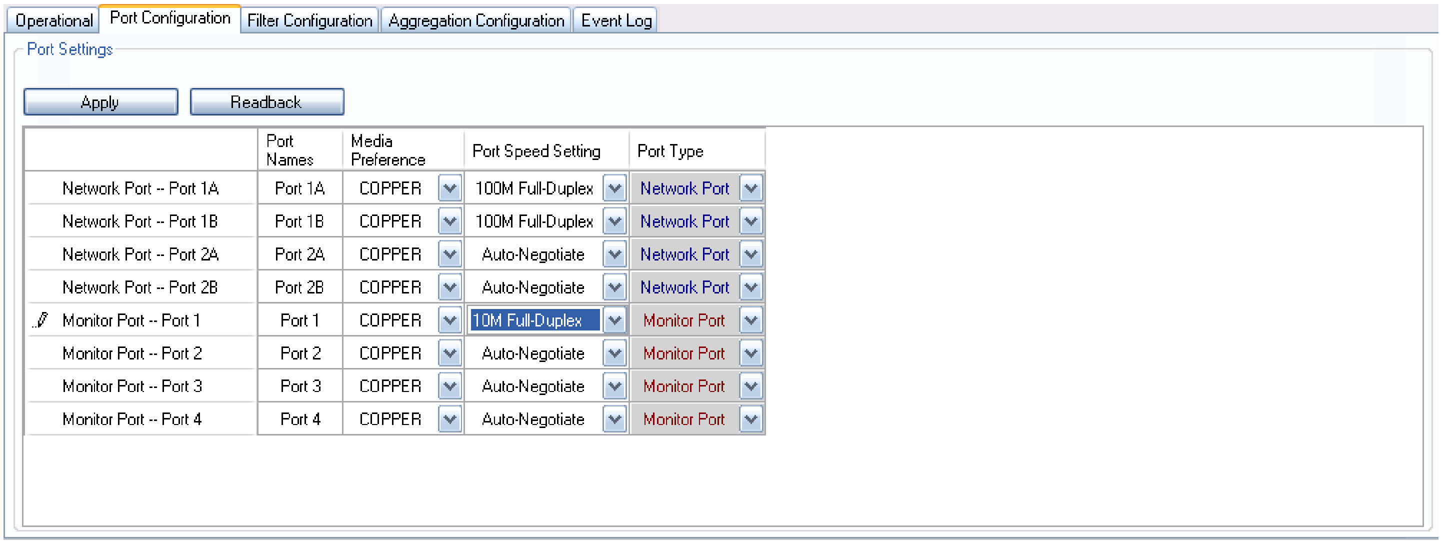


Figure 5.29 FSS-2000BT Network Printer Application with Network Analyzer

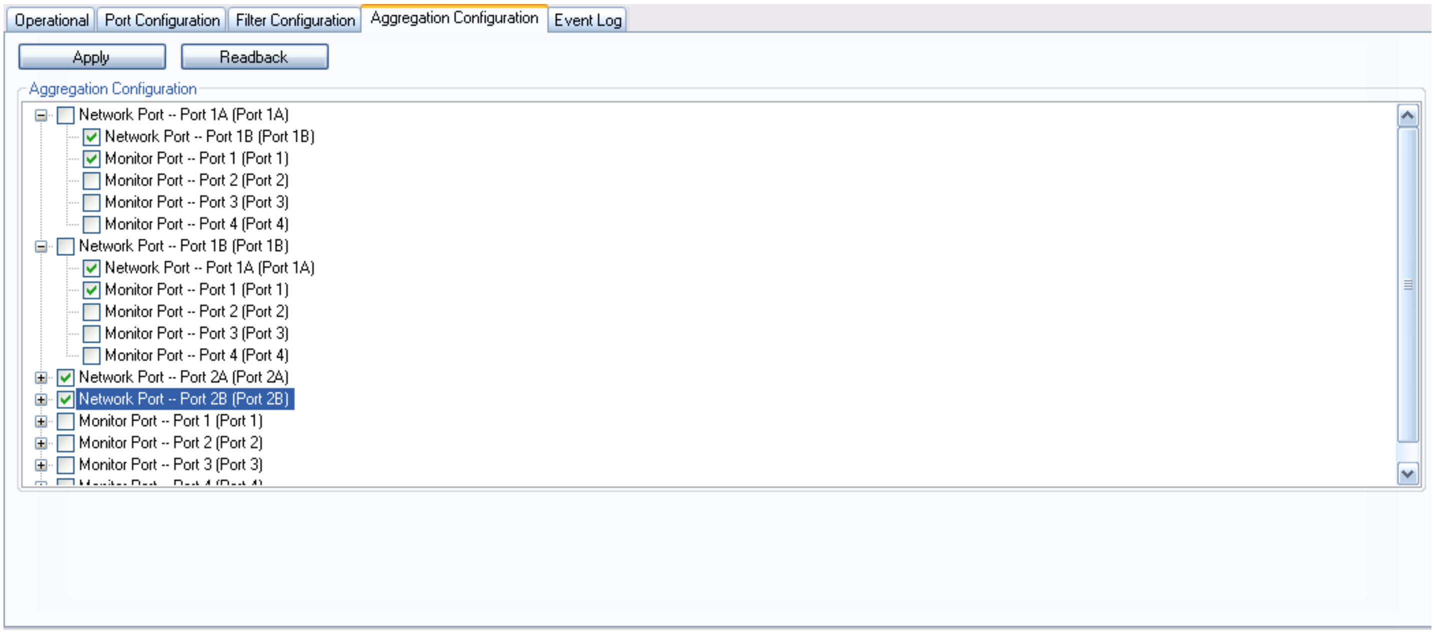
To create the route, connect your PC to the Filtered SINGLE*stream*™, login to the Filter Product Console, and click on the **Port Configuration** tab. By default, the Media Preference for each port is Copper, and the port speed is set to Auto-Negotiate. For this example, set the port speed to 100BaseT Full-Duplex for the Network Tap, and 10BaseT Full-Duplex for the Monitor Port. Once the changes have been made, click **Apply**.



	Port Names	Media Preference	Port Speed Setting	Port Type
Network Port -- Port 1A	Port 1A	COPPER	100M Full-Duplex	Network Port
Network Port -- Port 1B	Port 1B	COPPER	100M Full-Duplex	Network Port
Network Port -- Port 2A	Port 2A	COPPER	Auto-Negotiate	Network Port
Network Port -- Port 2B	Port 2B	COPPER	Auto-Negotiate	Network Port
Monitor Port -- Port 1	Port 1	COPPER	10M Full-Duplex	Monitor Port
Monitor Port -- Port 2	Port 2	COPPER	Auto-Negotiate	Monitor Port
Monitor Port -- Port 3	Port 3	COPPER	Auto-Negotiate	Monitor Port
Monitor Port -- Port 4	Port 4	COPPER	Auto-Negotiate	Monitor Port

Figure 5.30 Port Configuration Tab - Network Printer Application

Next, create the route by clicking on the **Aggregation Configuration** tab. Ensure that both ports of Network Tap 1, ports 1A and 1B, are configured to forward traffic to Monitor Port 1 as shown in the figure below. Once you have made the configuration changes, click **Apply**.

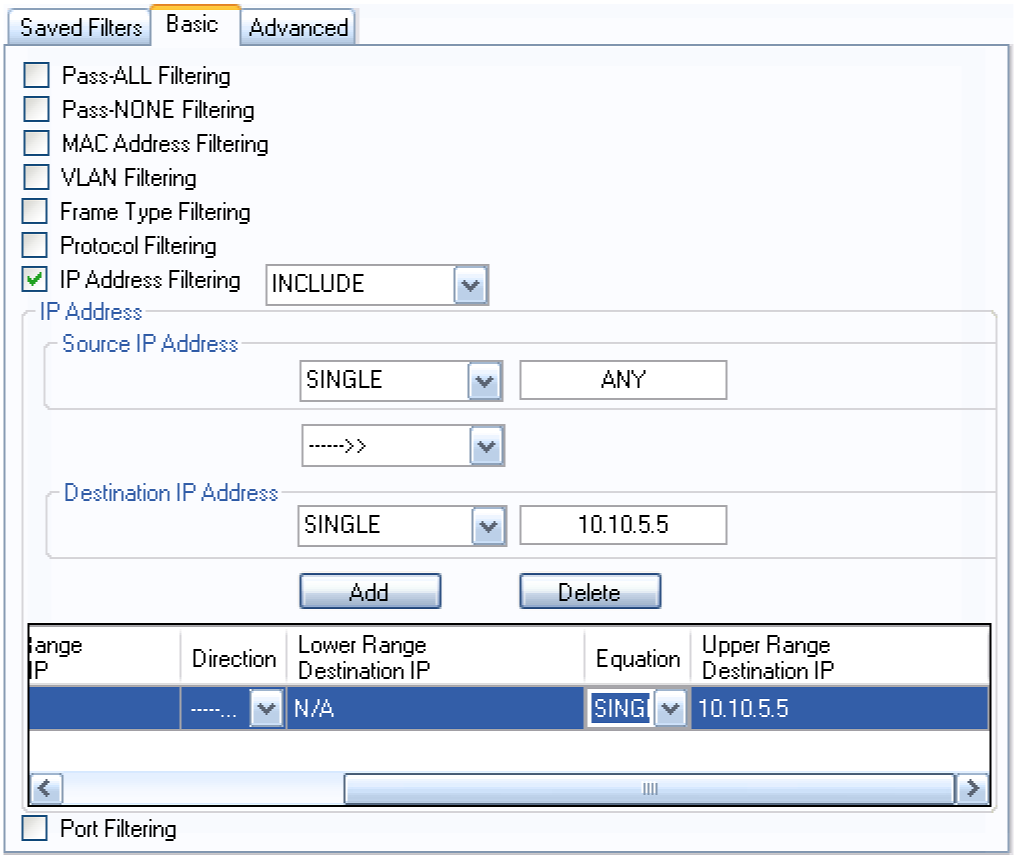


- ☐ Network Port -- Port 1A (Port 1A)
    - ☑ Network Port -- Port 1B (Port 1B)
    - ☑ Monitor Port -- Port 1 (Port 1)
    - ☐ Monitor Port -- Port 2 (Port 2)
    - ☐ Monitor Port -- Port 3 (Port 3)
    - ☐ Monitor Port -- Port 4 (Port 4)
- ☐ Network Port -- Port 1B (Port 1B)
    - ☑ Network Port -- Port 1A (Port 1A)
    - ☑ Monitor Port -- Port 1 (Port 1)
    - ☐ Monitor Port -- Port 2 (Port 2)
    - ☐ Monitor Port -- Port 3 (Port 3)
    - ☐ Monitor Port -- Port 4 (Port 4)
- ☑ Network Port -- Port 2A (Port 2A)
- ☑ Network Port -- Port 2B (Port 2B)
- ☐ Monitor Port -- Port 1 (Port 1)
- ☐ Monitor Port -- Port 2 (Port 2)
- ☐ Monitor Port -- Port 3 (Port 3)
- ☐ Monitor Port -- Port 4 (Port 4)

Figure 5.31 Aggregation Configuration Tab - Network Printer Application

Now, a copy of the network traffic should be flowing to the connected LAN Analyzer. However, the 10BaseT half-duplex LAN Analyzer connection cannot support all of traffic on the full-duplex 100BaseT network. To prevent this over-subscription problem, a filter can be created that sends only the traffic of interest to the LAN Analyzer.

To create such a filter, click on the **Filter Configuration** tab. Select the **Basic** tab, and then check the **IP Address Filtering** check-box. To view only that traffic that is being sent to the network printer, configure the filter so that it includes traffic sent from any source IP address to the destination IP address of the network printer. Once you have configured the rule, click **Add**. Under the **Filter Functions** section on the right side of the window, name the new filter `printer_traffic` and click **Save**.



☐ Pass-ALL Filtering
☐ Pass-NONE Filtering
☐ MAC Address Filtering
☐ VLAN Filtering
☐ Frame Type Filtering
☐ Protocol Filtering
☑ IP Address Filtering INCLUDE

IP Address

Source IP Address SINGLE ANY

------>>

Destination IP Address SINGLE 10.10.5.5

ange IP	Direction	Lower Range Destination IP	Equation	Upper Range Destination IP
	-----...	N/A	SING	10.10.5.5

☐ Port Filtering

Figure 5.32 Filter Configuration Tab - Network Printer Application

Now the new filter is available, and can be applied to the various ports. Click on the **Operational** tab. The new `printer_traffic` filter can be applied to the Network Tap Ports 1A and 1B from the pull-down menu under the **Filters** section. Once configured correctly, click the **Apply** button. Also verify that the **Aggregation** and **Summary** sections show the correction information by clicking the **Readback** button for each section.

The LAN Analyzer should now only receive the traffic being sent to the network printer.

Appendix A Description of Frames and Packets

This section provides a description of an Ethernet frame and an Internet Protocol (IP) packet to aid the users with the creation of Advanced bit mask filters. Advanced Filters are discussed in Section 5 of this document. Typically, Layer 2 Ethernet frames are used to transport Layer 3 IP packets.

The figure below shows how an IP packet is encapsulated inside an Ethernet frame. Not all network traffic is the same, and there are many available networking protocols. Because many networks rely upon Ethernet at Layer 2 and IP at Layer 3, a brief description of each is provided in this Appendix.

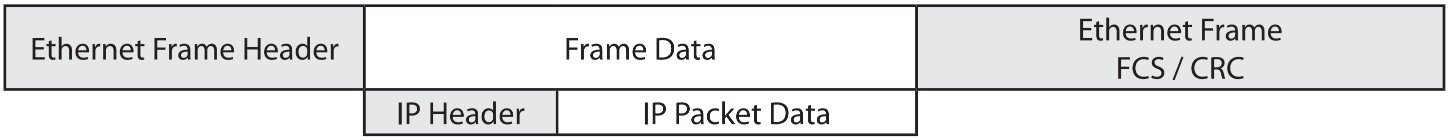


Figure A.1 Ethernet Frame Encapsulation of an IP Packet

On the next few pages, a more detailed description of the various fields that make up Ethernet frames and IP packets is provided. There are many types of Ethernet in use throughout the world; the most common types are Ethernet II and IEEE 802.3, although IEEE 802.3 SNAP and wireless IEEE 802.11 are also in use. The IP packet is the basic packet format used to transmit and received data across local and wide-area networks. Both Transmission Control Protocol (TCP) and User Datagram Protocol (UDP) messages are sent via IP packets.

The Filter Product Console software allows the user to create Advanced Filter rules that are applied to the first 64 bytes of any frame or packet. A full Ethernet frame header consists of 16 bytes (only 13 for the older and shorter Ethernet II format). An IP packet header consists of an additional 23 bytes.   To create a filter that checks the Type of Transfer Protocol field for IP packets encapsulated in Ethernet frames, an offset of 25 bytes would be used. An offset of 25 bytes means the filter would skip over the first 16 bytes of Ethernet frame (the entire header), and then skip over the first 9 bytes of the IP packet header. The Type of Transfer Protocol field is the 10th byte of the IP packet header, which means it has an offset of 9 bytes from the beginning of the IP header. The Type of Transfer Protocol field is also the 26th byte of the Ethernet frame. Right clicking on the offset of 25 bytes on the Filter Product Console’s Advanced Filter screen, and selecting **Add** allows for the creation of a rule for the content of the Type of Transfer Protocol (in this case).

Using a similar method, it is possible to create an Advanced Filter that examines any combination of bits, fields, and values within the first 64 bytes of any transmitted message. Before creating such a filter, you must first understand the format of the protocol(s) in use.

A.1 Ethernet Frame Formats

- Bytes 0-13 are the Data Link Header. This is used in all formats.
- Bytes 14-16 are the Logical Link Control (LLC) Header. This is used in the IEEE 802.3, IEEE 802.3 SNAP, and IEEE 802.11 formats.
- Bytes 17-21 are the Sub-Network Access Protocol (SNAP). This is used in the IEEE 802.3 SNAP format only.

Table A.1 Bit Mapping of an Ethernet Frame

Byte 0		Byte 1		Byte 2		Byte 3	
Bits 0-3	Bits 4-7	Bits 8-11	Bits 12-15	Bits 16-19	Bits 20-23	Bits 24-27	Bits 28-31
Destination MAC Address (Bytes 0-5)							
Byte 4		Byte 5		Byte 6		Byte 7	
Bits 32-35	Bits 36-39	Bits 40-43	Bits 44-47	Bits 48-51	Bits 52-55	Bits 56-59	Bits 60-63
Destination MAC Address (Bytes 0-5)				Source MAC Address (Bytes 6-11)			
Byte 8		Byte 9		Byte 10		Byte 11	
Bits 64-69	Bits 70-73	Bits 74-77	Bits 78-81	Bits 82-85	Bits 86-89	Bits 90-93	Bits 94-97
Source MAC Address (Bytes 6-11)							
Byte 12		Byte 13		Byte 14		Byte 15	
Bits 98-101	Bits 102-105	Bits 106-109	Bits 110-113	Bits 114-117	Bits 118-121	Bits 122-125	Bits 126-129
Frame Length (does not include pre-amble, CRC, DLC Addresses, or the Length Field itself. The range is 64-1518 Bytes, not used in Ethernet II format)				Destination Service Access Point (DSAP) Not used in Ethernet II format		Source Service Access Point (SSAP) Not used in Ethernet II format	
Byte 16		Byte 17*		Bytes (18 ~ 1497)			
Bits 130-133	Bits 134-137	Bits 138-141	Bits 142-145				
Control (specifies the type of Frame being sent) Not used in Ethernet II format		Data (this is where an IP header would begin…)					
4th to Last Byte		3rd to Last Byte		2nd to Last Byte		Last Byte	
Last 32 Bits							
Frame Check Sequence (FCS) also known as Cyclical Redundancy Check (CRC)							

*Bytes 17 through 21 can be used to transmit the Sub-Network Access Protocol (SNAP) Header. If this is used (only in IEEE 802.3 SNAP), the bytes 17, 18, and 19 are the Vendor's Code, while bytes 20 and 21 are the frame's Ethertype. Using this format, the Data would begin with Byte 22.

A.2 IP Packet Format

Table A.2 Bit Mapping of an IP Packet

Byte 0		Byte 1		Byte 2		Byte 3	
Bits 0-3	Bits 4-7	Bits 8-11	Bits 12-15	Bits 16-19	Bits 20-23	Bits 24-27	Bits 28-31
IP Version	IP Header Length	Type of Service (not used)		Total Length of Datagram (header & data)			
Byte 4		Byte 5		Byte 6		Byte 7	
Bits 32-35	Bits 36-39	Bits 40-43	Bits 44-47	Bits 48-51	Bits 52-55	Bits 56-59	Bits 60-63
16-bit Packet Identification Number				Routing Flags	Fragmentation Offset (used when a router fragments the original packet into multiple packets)		
Byte 8		Byte 9		Byte 10		Byte 11	
Bits 64-69	Bits 70-73	Bits 74-77	Bits 78-81	Bits 82-85	Bits 86-89	Bits 90-93	Bits 94-97
Time To Live (TTL) (Number of permitted router hops)		Type of Transfer Protocol Used		16-bit Header Checksum			
Byte 12		Byte 13		Byte 14		Byte 15	
Bits 98-101	Bits 102-105	Bits 106-109	Bits 110-113	Bits 114-117	Bits 118-121	Bits 122-125	Bits 126-129
32-bit Source IP Address							
Byte 16		Byte 17		Byte 18		Byte 19	
Bits 130-133	Bits 134-137	Bits 138-141	Bits 142-145	Bits 146-149	Bits 150-153	Bits 154-157	Bits 158-161
32-bit Destination IP Address							
Byte 20		Byte 21		Byte 22		Byte 23	
Bits 162-165	Bits 166-169	Bits 170-173	Bits 174-177	Bits 178-181	Bits 182-185	Bits 186-189	Bits 190-193
Options (if any) for the IP Packet							
Byte 24		Byte 25		Byte 26		Byte 27	
Bits 194-197	Bits 198-201	Bits 202-205	Bits 206-209	Bits 210-213	Bits 214-217	Bits 218-221	Bits 222-225
Start of Transmitted Data….							

Appendix B HyperTerminal Commands

In Section 4 Connecting a PC to a Filtered SINGLE*stream*™, only the commands to configure the IP address of the Filtered SINGLE*stream*™ are discussed. As shown in Section 4, you may use the supplied serial cable and a PC equipped with a DB-9 serial port to configure your Filtered SINGLE*stream*™. The connection between the PC and the Filtered SINGLE*stream*™ is depicted in the figure below.

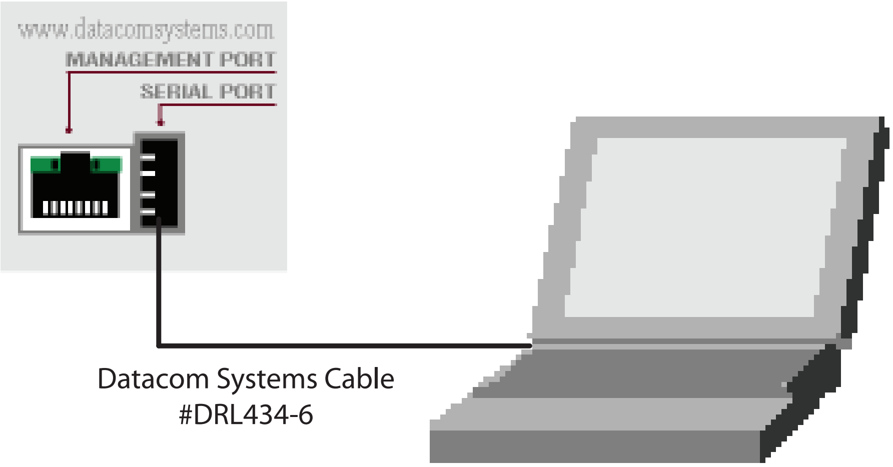
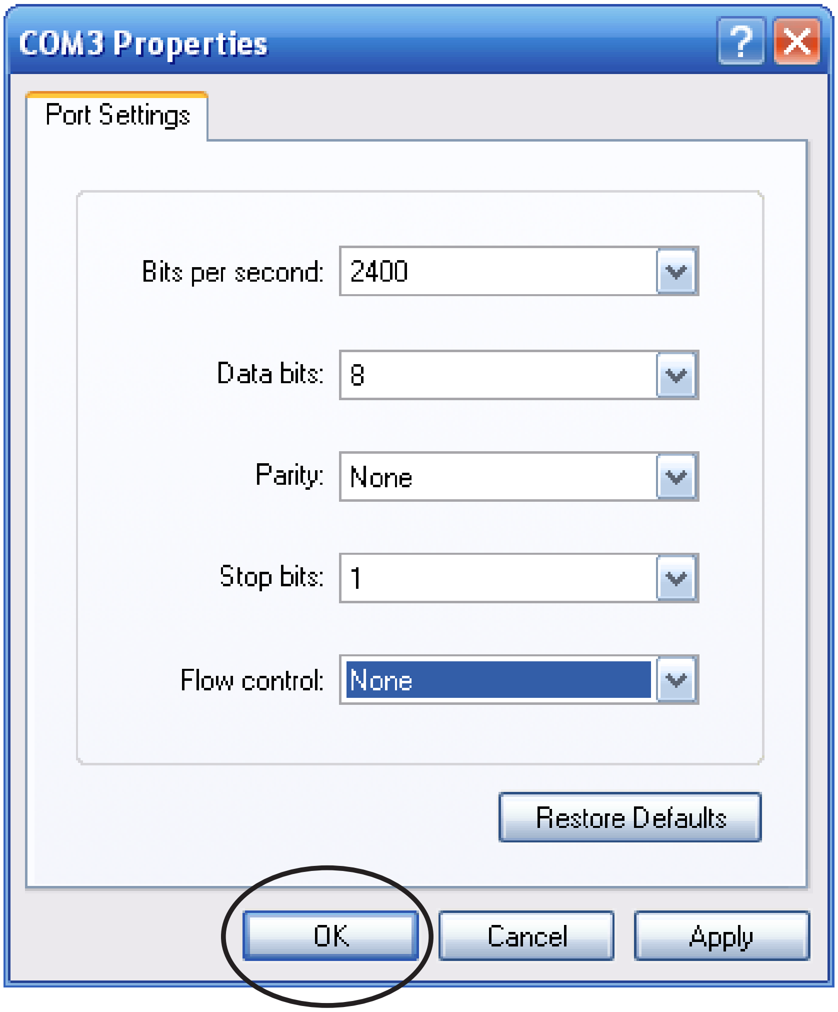


Figure B.1 FSS Serial PC Connection

To ensure proper communication, the HyperTerminal connection must use the same configuration settings as the Filtered SINGLE*stream*™. Through HyperTerminal, configure the COM port of the PC as shown in the figure below.



Bits per second: 2400

Data bits: 8

Parity: None

Stop bits: 1

Flow control: None

Figure B.2 HyperTerminal COM Properties Window

Once you have connected, many commands are available for use. In the following table, a brief description of each of the commands and configuration options is provided.

TIP The default user name is `Administrator` and the default password is `admin`.

Table B.1 FSS HyperTerminal Commands

Command	Syntax	Function
`CLEAR SYSLOG`	-	Clears the system log records stored on the Filtered SINGLE*stream*™
`EXIT`	-	Terminates the HyperTerminal Session
`HELP`	-	Shows list of available commands / options
`QUIT`	-	Terminates the HyperTerminal Session
`SET IP ADRESS`	`x.x.x.x`	Sets the IP address of the Filtered SINGLE*stream*™
`SET IP BROADCAST`	`x.x.x.x`	Sets the broadcast address used by the Filtered SINGLE*stream*™ (typically the 255 node)
`SET IP DEFAULT GATEWAY`	`x.x.x.x`	Sets the IP address of the default gateway used by the Filtered SINGLE*stream*™ to access non-local networks (typically a local router)
`SET IP SUBNET`	`x.x.x.x`	Sets the IP subnet mask used for the local network (Typical Class C network uses 255.255.255.0)
`SET TCP PORT`	`xxxxx`	Sets the TCP port number used by the Filtered SINGLE*stream*™. Port numbers range from 1 to 65535, with many ports being reserved for well-known uses - Port 21 is used for FTP and port 80 is used for HTTP. If you select a well-known port number, you may experience minor network problems.
`SHOW IP`	-	Shows the current settings for the IP address, subnet mask, and default gateway.

Appendix C Product Specification

Specifications for: FSS-1000 BT, LX, and SX models
FSS-2000 BT, LX, SX, BT/LX, and BT/SX models

Table C.1 Filtered SINGLE*stream*™ Product Specifications

Physical Specifications
Sizes: 3" (7cm) H *x* 18" (40cm) W *x* 9" (20cm) D
Unit Weight: 7 lbs (3.2 kg)
Network Tap Physical Connections
BT ports: - RJ45 connector, - Cat 5E cable, - 10/100/1000 Mbps (auto sensing)
SX ports: - Short-haul, Multi-mode fiber, - 50 or 60.5 microns, - 1000 Mbps
LX ports: - Long-haul, Single Mode fiber, - 9 microns, - 1000 Mbps
Monitor Port Physical Connections
BT ports: - RJ-45 connector, - Cat 5E cable, - 10/100/1000 Mbps (auto sensing)
Fiber ports: - LC connector allowing for SX or LX - 1000 Mbps
Power Specifications
Voltage: 100 – 240 VAC
Ampere: 1.5 A
Frequency: 50-60 Hz
Redundant Power Connections
Environmental Specifications
Operating Temperature: 32°F to +104°F (0°C to +40°C)
Storage Temperature: -22°F to +149°F (-30°C to +65°C)
Operating Humidity: Up to 95% non-condensing

Index

Customer Service

This User's Guide is designed to help you get to know your new Filtered SINGLE*stream*™ quickly and easily.   Datacom Systems Customer Service personnel are available weekdays from 8:30 AM to 5:00 PM EST. Customer Service is available via telephone, facsimile, and E-mail. Outside of support hours, please leave a voice message and Customer Service will return your call as soon as possible.

Mail

Datacom Systems, Inc.
Attention: Technical Support
9 Adler Drive
East Syracuse, NY 13057-1290

Telephone

+1 315-463-9541

FAX

+1 315-463-9557

E-mail

support@datacomsystems.com

WWW

http://www.datacomsystems.com

Compliance Testing

CAUTION: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment has been tested and found to meet the radiated and conducted emission limits for a **Class A** product of **EN 55022** to the European Community **EMC Directive 89/336/EEC** requirements.

This equipment has been tested and found to meet general immunity standard **EN 61000-6-1:2001** for residential, commercial and light industrial devices. This equipment has been tested to meet specific immunity standards: **EN 6100-4-2** for electrostatic discharge, **EN 61000-4-3** for radiated susceptibility, **EN 61000-4-4** for electrical fast transient/burst, **EN 61000-4-5** for surge, **EN 61000-4-6** for conducted susceptibility, **EN 61000-3-2** for harmonic current, and **EN 61000-3-3** for voltage fluctuations & flicker.

This equipment has been tested and found to meet the **Low Voltage Directive 98/68/EEC**.

Factory Warranty

Datacom Systems, Inc. (DSI) warrants the hardware and software which it supplies will be free from significant defects in materials and workmanship for a period of (12) months for hardware and (90) days for software from the date of delivery (Warranty Period), under normal use and conditions. In the event of any such defect, you can return an item of defective hardware, freight prepaid, to DSI during the Warranty Period, and DSI will repair or replace the defective equipment with an equivalent or better model and return it to you, freight prepaid. If DSI determines that the equipment is not defective, it will return to you freight collect. DSI shall have no responsibility for any deficiency resulting from accidents, misuse, modifications, power disturbances (including use of a power supply not specified by DSI), or various forms of disaster e.g. earthquakes, floods, etc.

Limitations on Liability

The warranties set forth above are exclusive and in lieu of all other warranties. Datacom Systems, Inc. (DSI) makes no other warranties, expressed or implied, and DSI expressly disclaims all other warranties, including but not limited to implied warranties of merchantability and fitness for a particular purpose. Moreover, the provisions set forth above state DSI's entire responsibility and your sole and exclusive remedy with respect to any breach of warranty or contract.

No liability for consequential damages. Under no circumstances and under no theory of Liability shall DSI be liable for costs of procurement of substitute products or services, lost profits, lost savings, loss of information or data, or any other special, indirect, consequential or incidental damages, arising in any way out of the sale of, use of, or inability to use, any DSI product or service, even if DSI has been advised of the possibility of such damages.

Force Majeure

Datacom Systems, Inc. (DSI) will not be liable for any failure to perform due to unforeseen circumstances or causes beyond DSI's reasonable control, including, but not limited to acts of God, war, riot, embargoes, acts of civil or military authorities, fire, flood, accidents, strikes, inability to secure transportation, facilities, fuel, energy, labor, or materials.

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